216

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| TRADE NAME | MODEL | SET AND FOLDER NO. |
|---|---|---|
| Dumont | RA-166, RA-167, RA-170, RA-171 Tel. Rec. | 216-2 |
| Hallicrafters | 1051P, 1052P (Ch. P1200D), 1053P, 1054P (Ch. R1200D), 1055C, 1056C, 1060C, 1061C (Ch. T1200D), 1062C, 1063 (Ch. J1200D) Tel. Rec., Prod. Chg. Bul. 75 | 216-1 |
| Masco | EMM-6 | 216-3 |
| Mirrortone | A-17C, T, A-21C, CB, T, TB, X, Z (Ch. 9040) Tel. Rec. | 216-4 |
| Motorola | 403 | 216-5 |
| Nash | NH3C | 216-6 |
| Olympic | 17C57, 17K55, 17T56 (Ch. TM-17) Tel. Rec. | 216-7 |
| Pacific-Mercury | 2217, 2218, X, 2224, 2284 (Ch. 200-11) Tel. Rec. | 216-8 |
| Roland | 6T1M | 216-9 |
| Silvertone | 3040 (Ch. 528.253), 3045, 3046 (Ch. 528.254) | 216-10 |
| V-M | 950, 951 (Late) Record Changer | 216-11 |

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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 6 IN SET 188

HALLICRAFTERS MODELS 1051P, 1052P (Ch. P1200D), 1053P, 1054P (Ch. R1200D), 1055C, 1056C, 1060C, 1061C (Ch. T1200D), 1062C, 1063, (Ch. J1200D)

Hallicrafters Models 1051P, 1052P (Ch. P1200D), 1053P, 1054P (Ch. R1200D), 1055C, 1056C, 1060C, 1061C (Ch. T1200D), 1062C and 1063C (Ch. J1200D) are similar to the Models covered in Photofact Folder 6, Set 188.

Ch. A1200D may be considered as the basic chassis for this group. As new chassis are added modifications are grouped as to the reason for the change and coded by a roman numeral. Modifications I through VII are covered on pages 12 and 17 in Photofact Folder 8, Set 188. Modifications VIII through XIII are covered in this Production Change Bulletin.

A chart showing the differences in the new chassis is given below:

## COMPARISON OF 1200 SERIES CHASSIS

| CHASSIS | PIX TUBE SIZE See Modification I | HEATER CIRCUIT See Modification IV | TUNER TYPE See Modifications VII, XI | MODIFICATION USED and/or Notes for Run 1 |
|---|---|---|---|---|
| J1200D | 21" Metal | Transformer | 1E1380 Cascode | I, IV, VI, VII, IX, X, XI, XII, XIII * |
| P1200D | 17" Glass | Series-Parallel | 1C1345 Pentode | VI, IX, X |
| R1200D | 21" Metal or Glass | Series-Parallel | 1C1345 Pentode | I, VI, VIII, IX, X, XIII * |
| T1200D | 21" Metal | Transformer | 1C1376 Cascode | I, IV, VI, VII, VIII, IX, X, XII, XIII * |

* Modification XIII will be found only in J, R and T1200D chassis which have a "Run 1A" in chassis stamp.

## MODIFICATION VIII

To use a metal picture tube a 500MMF (20,000 volt), high voltage filter, capacitor (C80) is added from pin 7 of V17 (1B3GT) to ground.

## MODIFICATION IX

The following mechanical changes were made:

A. A deeper chassis with a depth of 3 3/4" instead of 3" is used.
B. The tuner, three IF amplifiers, video detector, video amplifier, sound IF amplifier and ratio detector are mounted on a separate sub-chassis.
C. The video test socket was omitted.
D. The 6C4, audio amplifier tube, V9, is moved to a new location slightly forward and to the left of the vertical output transformer, T3.

## MODIFICATION X

The horizontal stabilizer coil, L29 (part #55B1536) is replaced by coil, part #51B1642, and its mounting plate, part #63A902. When the coil (part #51B1642) is used the plate (part #63A902) must also, be used and the 75MMF capacitor (C75) connected from pin 5 of V14 to ground, is omitted. For replacement purposes either coil may be used, but part #51B1642 is prefered.

PRODUCTION CHANGES
BULLETIN 75

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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## MODIFICATION XI

To use a 1E1380 Cascode Tuner in place of the 1C1345 pentode tuner the following changes were made:

A. The 1C1345 pentode tuner is removed and replaced by the 1E380 Cascode tuner. The 1E1380 tuner does not have terminal lugs on the back, therefore, the wire leads from the tuner must be connected to the correct points in the circuit. The 1E1380 tuner may be used only with 3 3/4" deep chassis which have a heater transformer. A schematic and an alignment chart for this tuner are given in this Production Change Bulletin.
B. R19, in the AGC line, and R20, in the B+ line, are omitted when this tuner is used.

## MODIFICATION XII

The vertical and horizontal hold controls were moved from the rear apron of the chassis to a removable plate mounted on the front apron of the chassis.

## MODIFICATION XIII

To improve vertical and horizonal sync, particularly in extreme fringe areas, the following changes were made:

A. R40 was changed from 10KΩ to 22KΩ.
B. R50 was changed from 470KΩ to 220KΩ.
C. R60 was changed from 47KΩ to 33KΩ.
D. C59 was changed from 22MMF to 47MMF.
E. A 1000MMF capacitor was added between pin 5 (plate) of the 12AX4 damper tube (V16) and ground.

### TUNER ALIGNMENT CHART FOR CHASSIS USING 1E1380 TUNER

**OSCILLATOR ALIGNMENT**

Remove the dummy converter tube and replace the original 6J6 in its socket.
The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the bias battery as under Video IF Alignment.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 12. | Two 120Ω Carbon Resistors | Across antenna terminals with 120Ω in each lead. | 213MC (10MC Swp) | 211.25MC 215.75MC | 13 | Vert. amp to point (A). Low side to chassis. | A13 | Adjust to place sound marker in notch as in Fig. 6. Video marker should be at 50%. |
| | | | 207MC (10MC Swp) | 205.25MC 209.75MC | 12 | | A14 | |
| | | | 201MC (10MC Swp) | 199.25MC 203.75MC | 11 | | A15 | |
| | | | 195MC (10MC Swp) | 193.25MC 197.75MC | 10 | | A16 | |
| | | | 189MC (10MC Swp) | 187.25MC 191.75MC | 9 | | A17 | |
| | | | 183MC (10MC Swp) | 181.25MC 185.75MC | 8 | | A18 | |
| | | | 177MC (10MC Swp) | 175.25MC 179.75MC | 7 | | A19 | |
| | | | 85MC (10MC Swp) | 83.25MC 87.75MC | 6 | | A20 | |
| | | | 79MC (10MC Swp) | 77.25MC 81.75MC | 5 | | A21 | |
| | | | 69MC (10MC Swp) | 67.25MC 71.75MC | 4 | | A22 | |
| | | | 63MC (10MC Swp) | 61.25MC 65.75MC | 3 | | A23 | |
| | | | 57MC (10MC Swp) | 55.25MC 59.75MC | 2 | | A24 | |

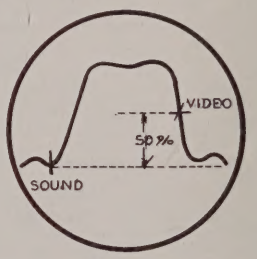


FIG. 6

**RF AND MIXER ALIGNMENT**

Remove 3 Volt battery as used under oscillator alignment. Connect the negative lead of a 1½ Volt battery to the ungrounded side of C29.
Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 13. | Two 120Ω Carbon Resistors | Across antenna terminals with 120Ω in each lead. | 207MC (10MC Swp) | 205.25MC 209.75MC | 12 | Vert. amp thru 10KΩ to point (F) Low side to chassis. | A25, A26, A27 | Adjust for response curve similar to Fig. 7. |
| 14. | " | " | 213MC (10MC Swp) | 211.25MC 215.75MC | 13 | " | | Check for response similar to Fig. 7. If markers fall below 70% on any channel make compromise adjustments of A25, A26 and A27 with channel switch set to that channel then check all other channels to see that they have not been seriously affected. |
| | | | 201MC (10MC Swp) | 199.25MC 203.75MC | 11 | | | |
| | | | 195MC (10MC Swp) | 193.25MC 197.75MC | 10 | | | |
| | | | 189MC (10MC Swp) | 187.25MC 191.75MC | 9 | | | |
| | | | 183MC (10MC Swp) | 181.25MC 185.75MC | 8 | | | |
| | | | 177MC (10MC Swp) | 175.25MC 179.75MC | 7 | | | |
| | | | 85MC (10MC Swp) | 83.25MC 87.75MC | 6 | | | |
| | | | 79MC (10MC Swp) | 77.25MC 81.75MC | 5 | | | |
| | | | 69MC (10MC Swp) | 67.25MC 71.75MC | 4 | | | |
| | | | 63MC (10MC Swp) | 61.25MC 65.75MC | 3 | | | |
| | | | 57MC (10MC Swp) | 55.25MC 59.75MC | 2 | | | |

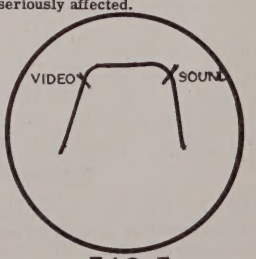
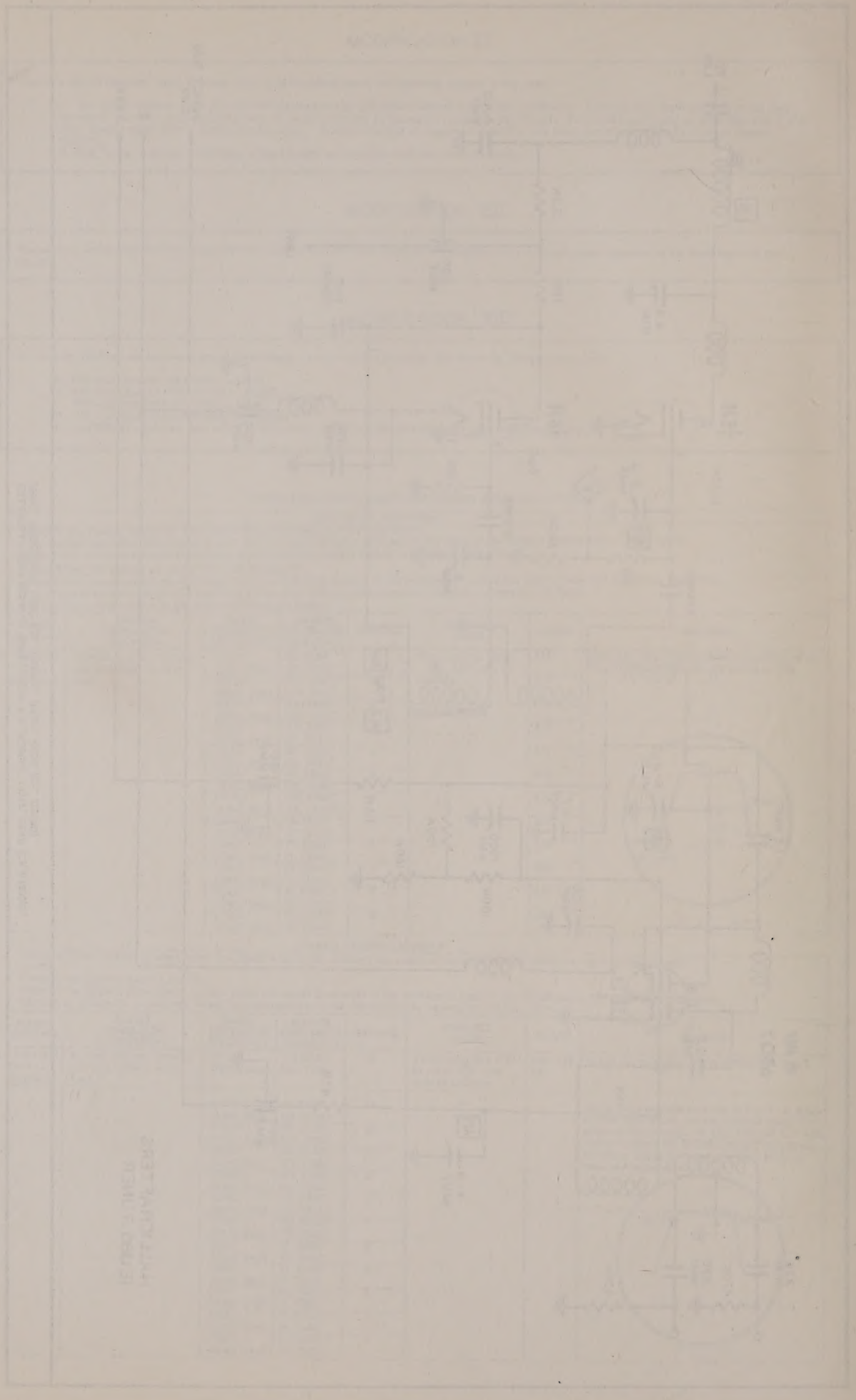


FIG. 7

HALLICRAFTERS MODELS 1051P, 1052P (Ch. P1200D), 1053P, 1054P (Ch. R1200D), 1055C, 1056C, 1060C, 1061C (Ch. T1200D), 1062C, 1063C (Ch. J1200D)



# DUMONT MODELS RA-166, RA-167, RA-170, RA-171

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CHASSIS RA-171

DUMONT MODELS RA-166, RA-167, RA-170, RA-171

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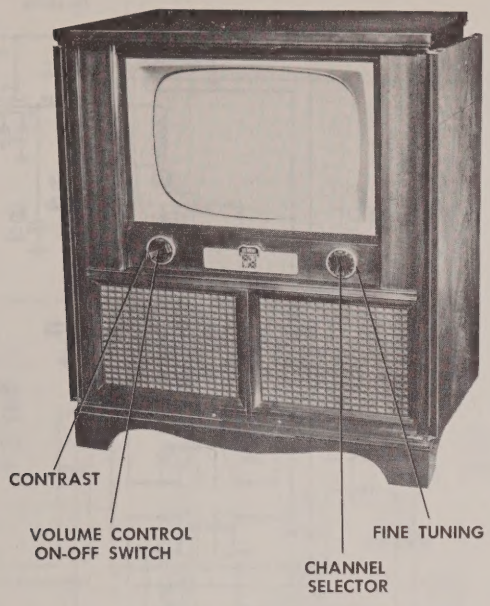
DATE 9-53 SET 216 FOLDER 2

# DUMONT MODELS RA-166, RA-167, RA-170, RA-171

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DUMONT MODELS RA-166, RA-167, RA-170, RA-171

DUMONT MODEL 21T376U (Somerset)

| TRADE NAME | Dumont | NAME | CHASSIS MODEL | SERVICES |
|---|---|---|---|---|
| | | Chatham | RA-166 | VHF |
| | | Ridgewood "41" | RA-167 | VHF |
| | | Wakefield "41" | RA-167 | VHF |
| | | Essex | RA-167 | VHF |
| | | Oxford | RA-167 | VHF |
| | | Lynwood | RA-167 | VHF |
| | | Chatham | RA-168, RA-169 | UHF-VHF |
| | | Somerset II | RA-170 | VHF (Phono Provisions) |
| | | Newbury II | RA-170 | VHF (Phono Provisions) |
| | | Hanover II | RA-170 | VHF (Phono Provisions) |
| | | Somerset II | RA-171 | UHF-VHF (Phono Provisions) |
| | | Newbury II | RA-171 | UHF-VHF (Phono Provisions) |
| | | Hanover II | RA-171 | UHF-VHF (Phono Provisions) |

| | |
|---|---|
| MANUFACTURER | Allen B. Dumont Laboratories, Inc., 257 16TH Ave., Paterson, N.J. |
| TYPE SET | Television Receiver |
| TUBES | Twenty-seven |
| POWER SUPPLY | 110-120 Volts AC-60 Cycle RATING 1.9 Amp. @ 117 Volts AC |
| TUNING RANGE | Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) |

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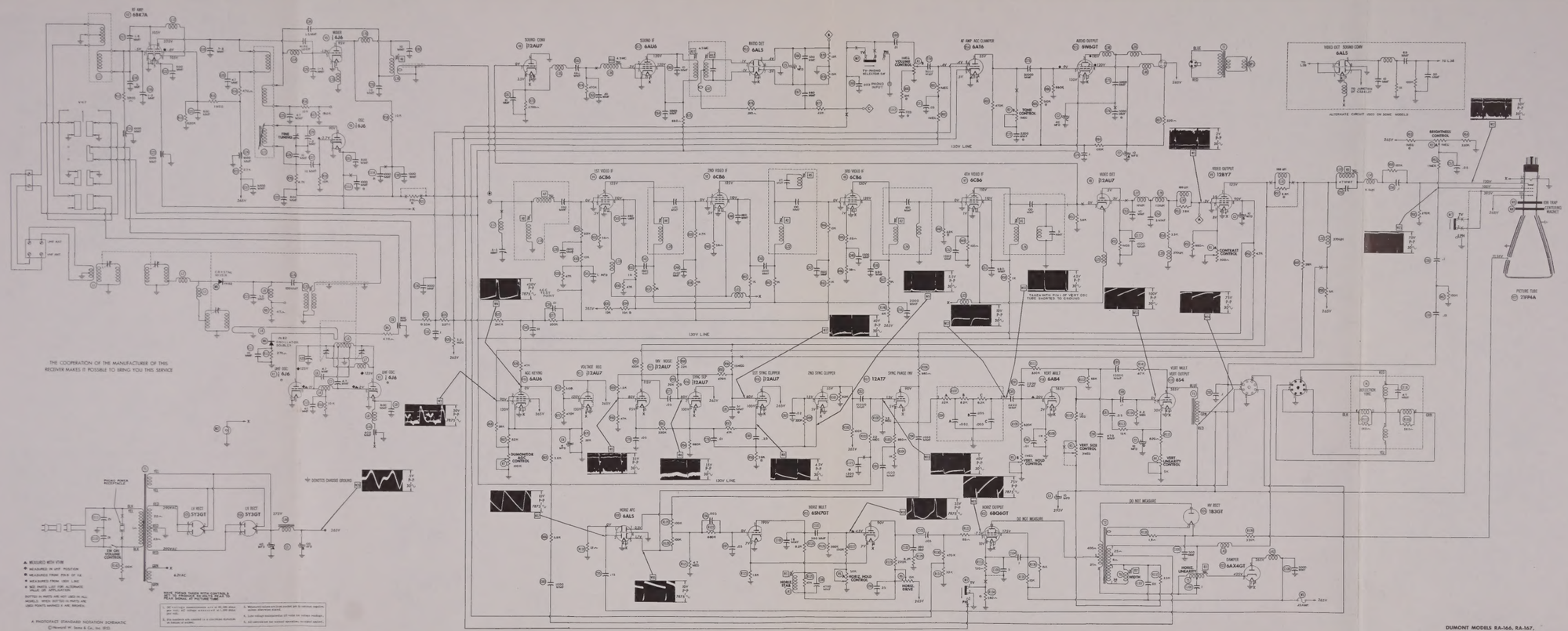

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DUMONT MODELS RA-166, RA-167, RA-170, RA-171



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# TUBE PLACEMENT CHART

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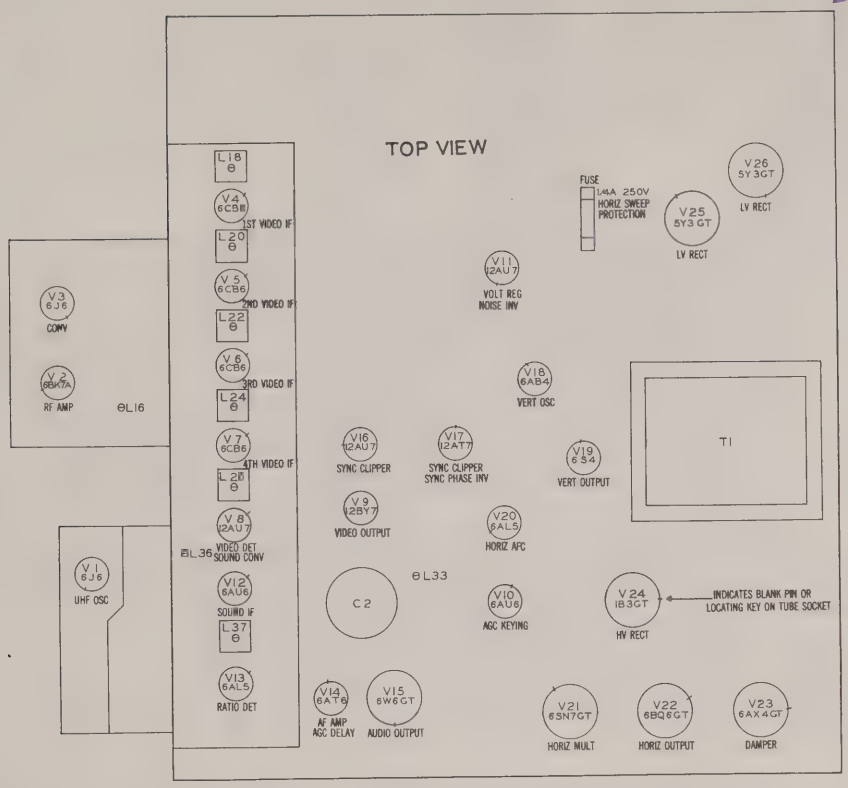



# TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V25, V26**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, V5, V6, V7, V15 (V1 UHF Only)**
No pic, no sound, has snow - **V2, V3, V4**
No pic, has sound, has raster - **V8, V9, V27**
Has pic, no sound - **V8, V12, V13, V14, V15**
Overloaded picture - **V10, V14**

SYNC FAILURE
No vert. sync - **V17, V18, V19**
No horiz. sync - **V17, V20, V21**
No vert. or horiz. sync - **V16, V17**

SWEEP FAILURE
No raster, has sound - **V21, V22, V23, V24, V27 Fuse(M1)**
No vertical deflection - **V18, V19**
Poor vert. linearity or foldover - **V18, V19**
Poor horiz. linearity or foldover - **V21, V22, V23**
Narrow picture - **V21, V22, V23, V24, V25, V26**
Vert. off freq. - **V17, V18, V19**
Horiz. off freq. - **V17, V20, V21**

# ALIGNMENT INSTRUCTIONS

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**

**The high voltage shock hazard can be eliminated by removing the horizontal oscillator tube, V21.**

## VIDEO IF ALIGNMENT

**Remove the converter tube, V3, from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.**
**Connect the negative lead of a 3 volt battery to the AGC test point. Connect the positive lead to chassis.**
**Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.**

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | Direct | High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis. | Not used. | 44.5MC | Any | Vert. amp to point (A) Low side to chassis. | A1 | Adjust for maximum deflection. Attenuate generator to maintain VTVM reading on lowest range. |
| 2. | " | " | " | 42.5MC | " | " | A2 | " |
| 3. | " | " | " | 46.1MC | " | " | A3 | " |
| 4. | " | " | " | 43.75MC | " | " | A4 | " |
| 5. | " | " | " | 47.25MC | " | " | A5 | Adjust for MINIMUM deflection. |
| 6. | " | " | 43.5MC (10MC Swp) | 42.5MC 44.8MC | " | Vert. amp thru detector (Fig.1) to pin 5 (plate) of 6CB6 (V4). Low side to chassis. | A6, A7, A8 | Adjust A6 and A7 to place 44.8MC marker on one peak of response curve similar to Fig.2. Adjust A8 to place 42.5MC markers on other peak. |
| 7. | .01MFD | High side to point (A). Low side to chassis. | Not used | 4.5MC (400~Mod) | " | Vert. Amp. thru detector (Fig. 1) to pin 11 (cathode) of picture tube. Low side to chassis. | A9 | Adjust for MINIMUM 400~ indication on scope. |

8. Replace the original 6J6 converter tube in its socket and remove bias battery. If the horizontal oscillator tube, V21, was removed to disable the high voltage, replace it, restoring the set to normal operation. Tune to the best TV signal available, preferably a test pattern. Adjust the fine tuning control until sound in the picture is eliminated. Examine picture for trailing whites or smear. If either condition is noted, adjust A7 not more than $\frac{1}{2}$ turn to eliminate the condition.

## SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 9. | .01MFD | High side to pin 5 (plate) of 6AL5 (V8). Low side to chassis. | 4.5MC (Unmod) | Any | DC probe to point (B) Common to chassis. | A10, A11 | Adjust for maximum deflection. |
| 10. | " | " | " | " | DC probe to point (C) Common to chassis. | A12 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

## SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

**Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.**

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 9. | .01MFD | High side to pin 5 (plate) of 6AL5 (V8). Low side to chassis. | 4.5MC (450KC Swp) | 4.5MC | Any | Vert. Amp. to point (B). Low side to chassis. | A10, A11 | Disconnect stabilizer capacitor C5. Adjust for response curve of maximum amplitude and symmetry as in Fig. 3. |
| 10. | " | " | " | " | " | Vert. Amp. to point (C). Low side to chassis. | A12 | Reconnect capacitor C5. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 4. SLIGHTLY retouch A-11 for maximum amplitude and straightness of crossover lines. |

## RF ALIGNMENT

**The tuner portions of this receiver have been properly aligned at the factory and are very stable. Alignment of these portions should not be required in the field.**

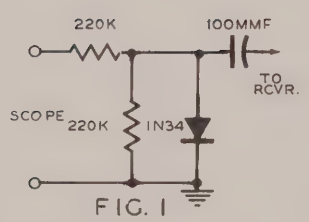


FIG. 1

FIG. 2

FIG. 3

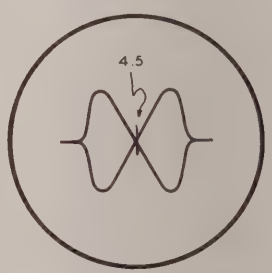
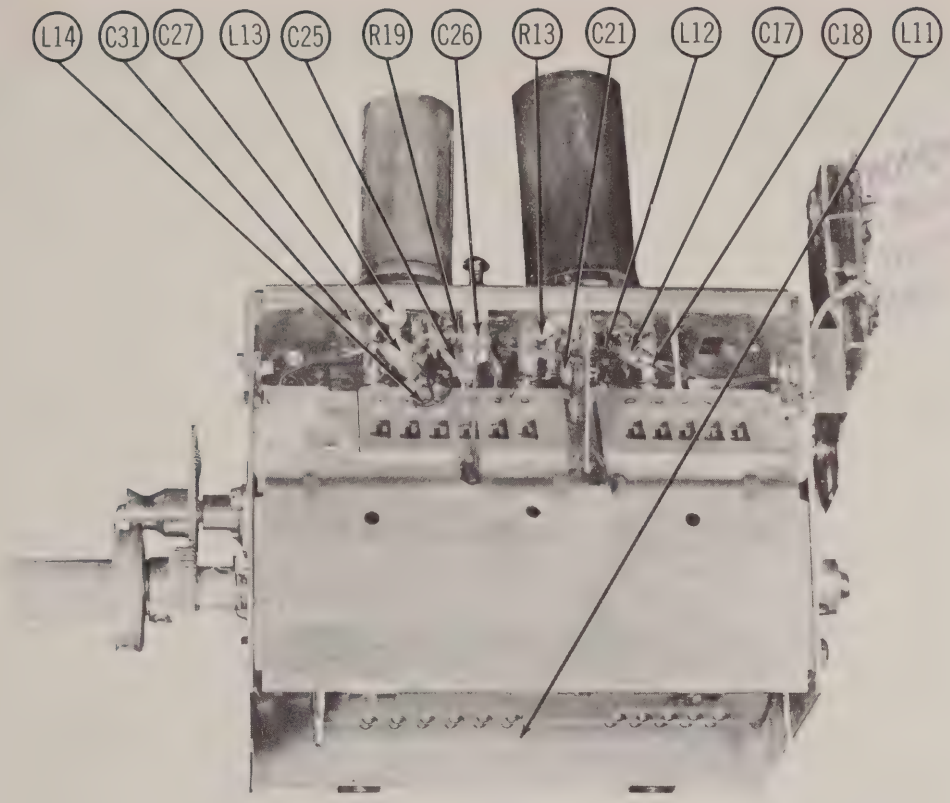
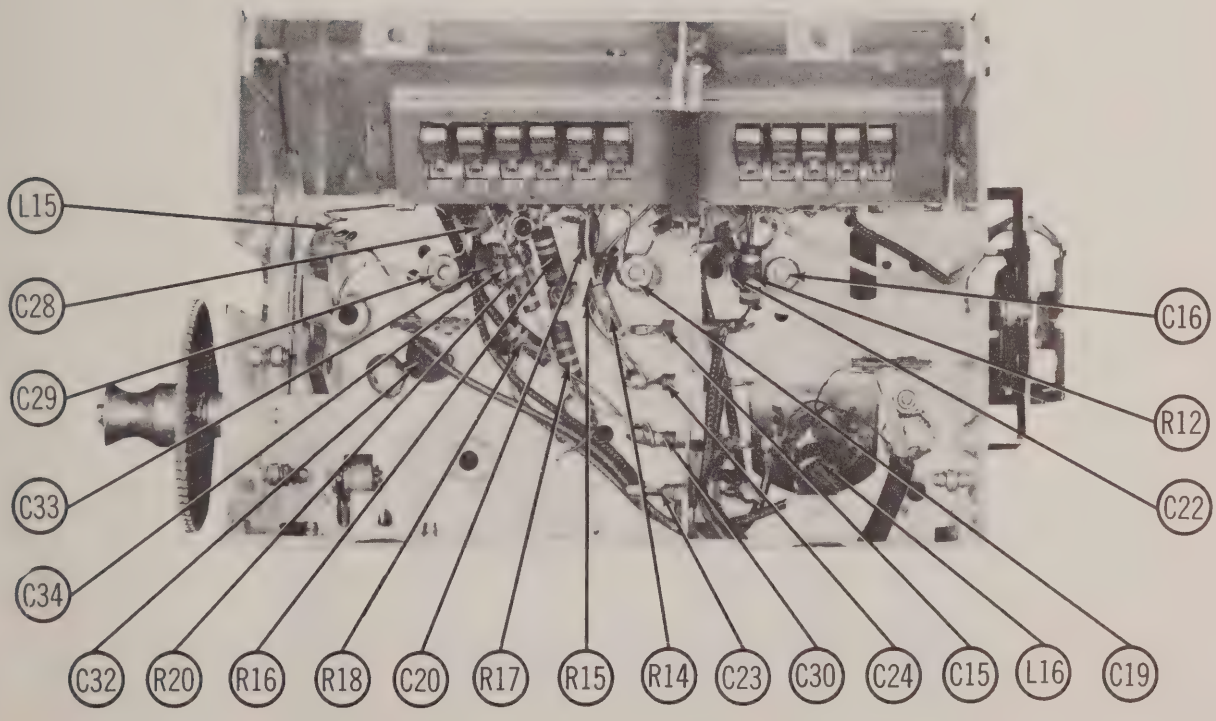


FIG. 4




RF TUNER-RIGHT SIDE



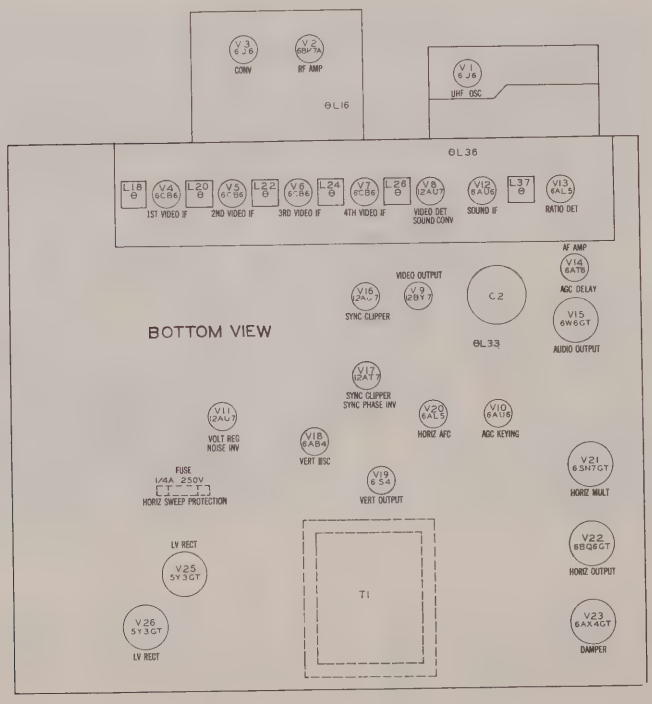

RF TUNER-LEFT SIDE

# RESISTANCE MEASUREMENTS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 6J6 | ▲‡470Ω | ▲‡470Ω | 0Ω | .1Ω | 10KΩ | 10KΩ | 0Ω | | |
| V 2 | 6BK7A | INF | 660KΩ | 0Ω | .1Ω | 0Ω | †3.2KΩ | †450KΩ | INF | 0Ω |
| V 3 | 6J6 | ‡5KΩ | ‡10.1KΩ | .1Ω | 0Ω | 190KΩ | 10KΩ | 0Ω | | |
| V 4 | 6CB6 | 75KΩ | 56Ω | .1Ω | 0Ω | †5.1KΩ | †18KΩ | 0Ω | | |
| V 5 | 6CB6 | 52KΩ | 56Ω | .1Ω | 0Ω | †5.1KΩ | †18KΩ | 0Ω | | |
| V 6 | 6CB6 | 57KΩ | 61Ω | .1Ω | 0Ω | †5.1KΩ | †5.1KΩ | 0Ω | | |
| V 7 | 6CB6 | .6Ω | 100Ω | .1Ω | 0Ω | ‡1KΩ | ‡1KΩ | 0Ω | | |
| V 8 | 12AU7 | 1 Meg | 3.3KΩ | .6Ω | .1Ω | .1Ω | 0Ω | .6Ω | 2.7KΩ | 0Ω |
| V 9 | 12BY7 | 27Ω | 3.3KΩ | 0Ω | 0Ω | 0Ω | .1Ω | 5.1KΩ | ‡4.7KΩ | 0Ω |
| V 10 | 6AU6 | †30KΩ | 28KΩ | .1Ω | 0Ω | 270KΩ | †41Ω | 28KΩ | | |
| V 11 | 12AU7 | †41Ω | 240KΩ | 28KΩ | .1Ω | .1Ω | †105KΩ | 25KΩ | 900KΩ | 0Ω |
| V 12 | 6AU6 | 470KΩ | 0Ω | 0Ω | .1Ω | †680Ω | †680Ω | 0Ω | | |
| V 13 | 6AL5 | INF | INF | .1Ω | 0Ω | 15KΩ | 0Ω | 15KΩ | | |
| V 14 | 6AT6 | 2 Meg | 0Ω | 0Ω | .1Ω | 400KΩ | 620KΩ | †570KΩ | | |
| V 15 | 6W6GT | INF | .1Ω | †445Ω | †260Ω | 320KΩ | †90KΩ | 0Ω | 50KΩ | |
| V 16 | 12AU7 | †41Ω | †60KΩ | 680KΩ | .1Ω | .1Ω | †41Ω | †500KΩ | 730KΩ | 0Ω |
| V 17 | 12AT7 | †55KΩ | 224KΩ | 3.9KΩ | .1Ω | .1Ω | ‡5.4KΩ | 3.8Meg | 1.7KΩ | 0Ω |
| V 18 | 6AB4 | ♦1.4Meg | INF | .1Ω | 0Ω | INF | 1.4Meg | 1KΩ | | |
| V 19 | 6S4 | 3KΩ | 2.2Meg | INF | 0Ω | .1Ω | INF | 2.2Meg | INF | ♦4.8KΩ |
| V 20 | 6AL5 | 12Ω | 12Ω | .1Ω | 0Ω | 4.8Meg | 0Ω | 4.8Meg | | |
| V 21 | 6SN7GT | 5.4Meg | †23KΩ | 1.8KΩ | 90KΩ | †230KΩ | 1.8KΩ | 0Ω | .1Ω | |
| V 22 | 6BQ6GT | 33KΩ | 0Ω | 500KΩ | †7.6KΩ | 500KΩ | INF | .1Ω | 150Ω | Top Cap ♦28Ω |
| V 23 | 6AX4GT | INF | INF | 1 Meg | INF | †44Ω | INF | 0Ω | .1Ω | |
| V 24 | 1B3GT | PINS 1 - 8 HAVE INF RESISTANCE | | | | | | | | Top Cap ♦428Ω |
| V 25 | 5Y3GT | INF | 22KΩ | INF | 22Ω | INF | 22Ω | INF | 22KΩ | |
| V 26 | 5Y3GT | INF | 22KΩ | INF | 23Ω | INF | 23Ω | INF | 22KΩ | |
| V 27 | 21FP4A | 0Ω | †1.6Meg | Pin 6 †41Ω | Pin 10 ♦3.3KΩ | Pin 11 100KΩ | Pin 12 .1Ω | | | |

ALL MEASUREMENTS TAKEN IN VHF POSITION UNLESS OTHERWISE SPECIFIED

▲ MEASURED IN "UHF" POSITION.
† MEASURED FROM PIN 8 OF V25.
‡ MEASURED FROM 130 V LINE.
♦ MEASURED FROM PIN 3 OF V23.




# TUBE PLACEMENT CHART

# PARTS LIST AND DESCRIPTIONS

## TUBES (SYLVANIA, GENERAL ELECTRIC or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA | | RTMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| | | DUMONT PART No. | STANDARD REPLACEMENT | | |
| V1 | UHF Oscillator | 6J6 | 6J6 | 7BF | Used in Models 21T376U, 21T377U, 21T378U |
| V2 | RF Amplifier | 6BK7A | 6BK7A | 9AJ | |
| V3 | Converter | 6J6 | 6J6 | 7BF | |
| V4 | 1st. Video IF Amp. | 6CB6 | 6CB6 | 7CM | |
| V5 | 2nd. Video IF Amp. | 6CB6 | 6CB6 | 7CM | |
| V6 | 3rd. Video IF Amp. | 6CB6 | 6CB6 | 7CM | |
| V7 | 4th. Video IF Amp. | 6CB6 | 6CB6 | 7CM | |
| V8 | Video Detector-Sound Converter | 12AU7 | 12AU7 | 9A | |
| V9 | Video Output | 12BY7 | 12BY7 | 9BF | |
| V10 | AGC Keying | 6AU6 | 6AU6 | 7BK | |
| V11 | Voltage Reg.-Noise Inverter | 12AU7 | 12AU7 | 9A | |
| V12 | Sound IF Amp. | 6AU6 | 6AU6 | 7BK | |
| V13 | Ratio Detector | 6AL5 | 6AL5 | 6BT | |
| V14 | AF Amplifier-AGC Clamper | 6AT6 | 6AT6 | 7BT | |
| V15 | Audio Output | 6W6GT | 6W6GT | 7S | |
| V16 | Sync. Sep. 1st. Sync Clipper | 12AU7 | 12AU7 | 9A | |
| V17 | 2nd. Sync. Clipper Sync. Phase Inv. | 12AT7 | 12AT7 | 9A | |
| V18 | Vert. Mult. | 6AB4 | 6AB4 | 5CE | |
| V19 | Vert. Mult. Vert. Output | 6S4 | 6S4 | 9AC | |
| V20 | Horiz. AFC | 6AL5 | 6AL5 | 6BT | |
| V21 | Horiz. Mult. | 6SN7GT | 6SN7GT | 8BD | |
| V22 | Horiz. Output | 6BQ6GT | 6BQ6GT | 6AM | |
| V23 | Damper | 6AX4GT | 6AX4GT | 4CG | |
| V24 | HV Rectifier | 1B3GT | 1B3GT | 3C | |
| V25 | LV Rectifier | 5Y3GT | 5Y3GT | 5T | |
| V26 | LV Rectifier | 5Y3GT | 5Y3GT | 5T | |

## CATHODE-RAY TUBE

| ITEM No. | REPLACEMENT DATA | | | RTMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| | DUMONT PART No. | SYLVANIA PART No. | GENERAL ELECTRIC PART No. | | |
| V27A | 21FP4A | 21FP4A | 21FP4A | 12C | ① Circuit changes necessary |
| | | 21FP4 ① | | 12C | |
| B | 17HP4 | 17HP4 | | 12C | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | DUMONT PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C1A | ▲40 | 400 | 03121080 | AFH2-64 | | CO35 | | FP378 | TVL-2679 | |
| B | ▲120 | 400 | | PRS450/40 | | BR4045A | | TC75 | | |
| C2A | ▲10 | 400 | 03124180 | AFH3-41 | | DO16 | | FP396.2 | TVL-4664 | |
| B | ■10 | 400 | | PRS50/10 | | | | TC32 | | |
| C | ▲40 | 200 | | | | | | | | |
| D | 10 | 50 | | | | | | | | |
| C3 | 10 | 350 | 03250411 | E26D190 | | BR1235A | | TC62 | TVA-1604 | |
| C4 | 4 | 200 | 03122480 | PRS250/4 | | BR425 | | TC50X | TVA-1501 | |
| C5 | 5 | 50 | 03120960 | PRS150/4 | | BR550 | | TC30 | TVA-1303 | |
| C6 | 4.7 | | 03126140 | | | | | | | |
| C7 | 4.7 | | 03126140 | | | | | | | |
| C8 | 800 | | 03125500 | | | | | | | |
| C9 | 800 | | | BPD-0008 | DD-801 | TM5D1 | 801-001 | DC-521 | 5HK-D1 | |
| C10 | 800 | | 03125500 | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C11 | 10 | | | SI10NP0 | TCZ-10 | | NP0K-100 | ZT-541 | 5TCC-Q1 | |
| C12 | 47 | | | | | | | | | |
| C13 | 33 | | 03126130 | SI33NP0 | TCZ-33 | | NP0K-330 | ZT-5433 | 5TCC-Q33 | |
| C14 | 100 | | 03125460 | SI100N750 | TCN-100 | | N750L-101 | NT-531 | 5TCU-T1 | |
| C15 | 1000 | | 03125500 | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C16 | 1-3 | | 03019840 | | 829-3 | | | CT565A | | |
| C17 | 1.8 | | 03125010 | | | | | | | |
| C18 | 5 | | 03124780 | SI5NP0 | TCZ-4.7 | | NP0K-050 | ZT-555 | 5TCCB-V47 | |
| C19 | .7-2 | | 03124770 | | | | | | | |
| C20 | 47 | | 03119170 | BPD-000047 | D6-470 | TM5Q5 | GP1K-470 | UC-5447 | 5GA-Q47 | |
| C21 | 800 | | 03124790 | BPD-0008 | DD-801 | TM5D1 | 801-001 | DC-521 | 5HK-D1 | |
| C22 | 800 | | 03124790 | BPD-0008 | DD-801 | TM5D1 | 801-001 | DC-521 | 5HK-D1 | |
| C23 | 1000 | | 03125500 | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C24 | 1000 | | 03125500 | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C25 | 47 | | 03119170 | BPD-000047 | D6-470 | TM5Q5 | GP1K-470 | UC-5447 | 5GA-Q47 | |
| C26 | 1-3 | | 03019840 | | 829-3 | | | CT565A | | |
| C27 | 10 | | 03126010 | SI10N750 | TCN-10 | | N750K-100 | NT-541 | 5TCU-Q1 | |
| C28 | 10 | | 03126010 | SI10N750 | TCN-10 | | N750K-100 | NT-541 | 5TCU-Q1 | |
| C29 | 1-3 | | 03019840 | | 829-3 | | | CT565A | | |
| C30 | 1000 | | 03125500 | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C31 | 800 | | 03124790 | BPD-0008 | DD-801 | TM5T8 | 801-001 | DC-521 | 5HK-D1 | |
| C32 | 10 | | 03125110 | SI10NP0 | TCZ-10 | | NP0K-100 | ZT-541 | 5TCC-Q1 | |
| C33 | 10 | | 03125110 | SI10NP0 | TCZ-10 | | NP0K-100 | ZT-541 | 5TCC-Q1 | |
| C34 | 1.5 | | 03125000 | SI1.5NP0 | TCZ-1.5 | | NP0K-1R5 | ZT-5515 | 5TCCB-V15 | |
| C35 | .1 | 200 | 03119740 | P288-1 | DF-104 | PJ 2P1 | | PT401 | 2TM-P1 | |
| C36 | 5000 | | 03015610 | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |
| C37 | 5000 | | 03015610 | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |
| C38 | 1500 | | 03017850 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C39 | .01 | 200 | 03014900 | P488-01 | D6-103 | PTE4S1 | GP2-333-103 | PT411 | 4TM-S1 | |
| C40 | .01 | 400 | 03014900 | P488-01 | D6-103 | PTE4S1 | GP2-333-103 | PT411 | 4TM-S1 | |
| C41 | 1.0 | 100 | 03122800 | 484-1.0 | | PJ2W1 | | PT41 | 2TM-M1 | |
| C42 | 1500 | | 03017850 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C43 | 680 | | 03121520 | SI680 | D6-681 | | GP2K-681 | UC-5368 | 5GA-T68 | |
| C44 | 1500 | | 03017850 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C45 | 1500 | | 03017850 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |

# PARTS LIST AND DESCRIPTIONS (Continued)

## CAPACITORS (CONT.)

| ITEM No. | RATING CAP. | RATING VOLT | REPLACEMENT DATA DUMONT PART No | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C46 | 680 | | 03121520 | SI680 | DS-681 | | GP2K-681 | UC-5368 | 5GA-T68 | |
| C47 | 1500 | | 03017850 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C48 | 680 | | 03121520 | SI680 | DS-681 | | GP2K-681 | UC-5368 | 5GA-T68 | |
| C49 | 1500 | | 03017850 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C50 | 20000 | | 03122430 | BPD-02 | | PTE62 | | PT62 | 6TM-S2 | |
| C51 | 680 | | 03121520 | SI680 | DS-681 | | GP2K-681 | UC-5368 | 5GA-T68 | |
| C52 | 1000 | | 03100490 | BPD-001 | DD-102 | TM5D1 | 801-001 | DC-521 | 5HK-D1 | |
| C53 | 10 | | | SI10NP0 | TCZ-100 | | NP0K-100 | ZT-561 | 5TCC-Q1 | |
| C54 | 5 | | | SI5NP0 | TCZ-4.7 | | NP0K-050 | ZT-555 | 5TCC-V47 | |
| C55 | 47 | | 03015760 | SI47NP0 | TCZ-47 | | NP0K-470 | ZT-5447 | 5TCC-Q47 | |
| C56 | .1 | 400 | 03119940 | P488-1 | DF-104 | PTE4P1 | | PT401 | 4TM-P1 | |
| C57 | .05 | 400 | 03120550 | P488-05 | DF-503 | PTE4S5 | | PT415 | 4TM-S5 | |
| C58 | .1 | 200 | 03120340 | P288-1 | DF-104 | PJ2P1 | | PT401 | 2TM-P1 | |
| C59 | .01 | 600 | 03120780 | P688-01 | D6-103 | PTE68I | GP2-333-103 | PT61I | 6TM-S1 | |
| C60 | 1000 | 2000 | 03123430 | BVD30-001 | | | | | 30GA-D1 | |
| C61 | 10 | | | SI10 | D6-100 | 5W5Q1 | GP1K-100 | UC-541 | 5GA-Q1 | |
| C62 | 680 | | 03121520 | SI680 | DS-681 | | GP2K-681 | UC-5368 | 5GA-T68 | |
| C63 | 20 | | | SI20NP0 | TCZ-20 | | NP0K-200 | ZT-542 | 5TCC-Q2 | |
| C64 | 5000 | | 03015610 | BPD-005 | MD-502 | TM5D5 | 801-005 | DC-525 | 5HK-D5 | |
| C65 | 10 | | 03015270 | SI10NP0 | TCZ-10 | | NP0K-100 | ZT-541 | 5TCC-Q1 | |
| C66 | 330 | | 03014390 | SI330 | D6-331 | | GP2K-331 | UC-5433 | 5GA-Q33 | |
| C67 | 680 | | 03121520 | SI680 | DS-681 | | GP2K-681 | UC-5368 | 5GA-T68 | |
| C68 | .003 | 600 | 03120200 | P688-003 | D6-302 | PTE6D3 | GP2-333-302 | PT623 | 6TM-D3 | |
| C69 | .01 | 600 | 03014900 | P688-01 | D6-103 | PTE6SI | GP2-333-103 | PT6II | 6TM-S1 | |
| C70 | 5000 | | 03015610 | BPD-005 | MD-502 | TM5D5 | 801-005 | DC-525 | 5HK-D5 | |
| C71 | .05 | 200 | 03119750 | P288-05 | DF-503 | PJ2S5 | | PT415 | 2TM-S5 | |
| C72 | 2200 | | 03124190 | BPD-0022 | DD-222 | PTE6D22 | GP2-333-222 | PT6222 | 5HK-D22 | Note 1 |
| C73 | 20000 | | 03122430 | BPD-02 | | PTE62 | | PT62 | 6TM-S2 | |
| C74 | .1 | 600 | 03120140 | P688-1 | DF-104 | PTE6P1 | | PT601 | 6TM-P1 | |
| C75 | 5000 | | 03015610 | BPD-005 | MD-502 | TM5D5 | 81-005 | DC-525 | 5HK-D5 | |
| C76 | 5000 | | 03015610 | BPD-005 | MD-502 | TM5D5 | 81-005 | DC-525 | 5HK-D5 | Note 2 |
| C77 | .05 | 200 | 03119750 | P288-05 | DF-503 | PJ2S5 | | PT415 | 2TM-S5 | |
| C78 | .05 | 400 | 03119950 | P488-05 | DF-503 | PTE4S5 | | PT415 | 4TM-S5 | |
| C79 | .1 | 400 | 03014900 | P488-01 | D6-103 | PTE4SI | GP2-333-103 | PT4II | 4TM-S1 | |
| C80 | .25 | 200 | 03119720 | P488-25 | | PTE4P25 | | PT4025 | 4TM-P25 | |
| C81 | 51 | 1500 | 03115330 | | | | | | | Note 3 |
| C82 | .02 | 200 | 03119770 | P488-02 | | PTE4S2 | | PT412 | 4TM-S2 | |
| C83 | 10000 | | 03015920 | BPD-01 | DD-103 | TM5S1 | 81-01 | DC-511 | 5HK-S1 | |
| C84A | .002 | | | {P688-002 | | PTE6D2 | | PT622 | | |
| B | .005 | | #80000631 | {P688-005 | #PC-100 | PTE6D5 | #1405-01 | PT625 | #101C1 | |
| C | .005 | | | {P688-005 | | PTE6D5 | | PT625 | | |
| C85 | 2200 | 500 | 03029480 | | | | | | | |
| C86 | .01 | 600 | 03014900 | P688-01 | D6-103 | PTE6SI | GP2-333-103 | PT6II | 6TM-S1 | |
| C87 | .05 | 600 | 03105100 | P688-05 | DF-503 | PTE6S5 | | PT615 | 6TM-S5 | |
| C88 | .1 | 600 | 03014830 | P688-1 | DF-104 | PTE6P1 | | PT601 | 6TM-P1 | |
| C89 | 10000 | 1000 | 03119830 | | | | | | 10KGI-S1 | |
| C90 | 470 | 2000 | 03122440 | HVD30-00047 | | | | | 30GA-T47 | |
| C91 | 2200 | 500 | 03100300 | | | | | | | |
| C92 | .1 | 600 | 03120740 | P688-1 | DF-104 | PTE6P1 | | PT601 | 6TM-P1 | |
| C93 | 1000 | | 03015810 | SI1000 | D6-102 | TM5D1 | GP2L-102 | UC-521 | 5HK-D1 | |
| C94 | 1000 | | 03015810 | SI1000 | D6-102 | TM5D1 | GP2L-102 | UC-521 | 5HK-D1 | |
| C95 | .15 | 600 | 03120730 | P688-15 | | PTE6P15 | | PT6P15 | 6TM-P15 | |
| C96 | .003 | 600 | 03015870 | P688-003 | D6-302 | PTE6D3 | GP2-333-302 | PT623 | 6TM-D3 | |
| C97 | .03 | 200 | 03100020 | P488-03 | | PTE4S3 | | PT413 | 4TM-S3 | |
| C98 | 4700 | 500 | 03003040 | 1464-005 | | 1EM5D5 | | MC8465 | MS-25 | |
| C99 | .25 | 600 | 03120120 | 684-25 | | PTE6P25 | | PT6025 | 6TM-P25 | |
| C100 | 18 | | 03121530 | | TCZ-18 | | SR5T4 | | MCB243 | MS-34 |
| C101 | 390 | 500 | 03021510 | 1469-0004 | | | SR5T4 | | MCB243 | MS-34 |
| C102 | 390 | 500 | 03021950 | 1469-0004 | | | SR5T4 | | MCB243 | MS-34 |
| C103 | .005 | 600 | 03120790 | P688-005 | D6-502 | PTE6D5 | GP2-333-502 | PT625 | 6TM-D5 | |
| C104 | .1 | 600 | 03120749 | P688-1 | DF-104 | PTE6P1 | | PT601 | 6TM-P1 | |
| C105 | .5 | 200 | 03119710 | P288-5 | | PJ2P5 | | PT405 | 2TM-P5 | |
| C106 | 5000 | | 03015610 | BPD-005 | MD-502 | TM5D5 | 81-005 | DC-525 | 5HK-D5 | |
| C107 | .03 | 600 | 03121200 | P688-03 | | PTE6S3 | | PT613 | 6TM-S3 | |
| C108 | .1 | 200 | 03104690 | | | | | | | |
| C109 | 500 | 20000 | 03121501 | HV20C | TV3-502 | MM-C20TS | 413-501 | | HV20035A | 20DK-T5 |
| C110 | .01 | 600 | 03123780 | 689ZX-01 | | PJ6SI | | | PT6II | 6TM-S1 |
| C111 | .01 | 600 | 03125780 | 689ZX-01 | | PJ6SI | | | PT6II | 6TM-S1 |
| C112 | .003 | 200 | 03101230 | P488-033 | | PTE6S3 | | | PT4133 | 6TM-S3 |
| C113 | 1000 | | | BPD-001 | DD-102 | TM5D1 | 801-001 | | DC-521 | 5HK-D1 |
| C114 | 1900 | | | BPD-001 | DD-102 | TM5D1 | 801-001 | | DC-521 | 5HK-D1 |
| C115 | 1500 | | 03017850 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | | DC-5215 | 5HK-D15 |
| C116 | 47 | 1600 | 03122461 | | | | | | | |
| C117 | 1000 | | | BPD-001 | DD-102 | TM5D5 | 801-001 | | DC-521 | 5HK-D1 |

Note 1. Used in Ch. RA-170 and RA-171 only.
Note 2. Not used in all Models.
Note 3. Some Models use 47MMF in this application.
◆ Items C84A, C84B, C84C, R107A, R107B, R107C are combined in one unit.

## CONTROLS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA DUMONT PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 500Ω | ½ | 01053131 | QJ-484 † | RTV-423 | | | Contrast-Panel |
| B | 1 Meg | ½ | | | | | UF1EL | Volume & Switch. Tap ④ 80KΩ-Rear |
| R2A | 1 Meg | ½ | 01038346 | QJ-486* | RTV-425 | | UR16A | Brightness-Panel Tone-Rear-Note |
| B | 1 Meg | ½ | | | | | SU-59 | Vert. Size |
| R3A | 3 Meg | ½ | 01051010 | QII-140 | AG-85-8 | AB-84 | AK-1 | Attach to R3A |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 | AK-1 | Not Req. | Vert. Lin. -Wire Wound |
| R4A | 5000Ω | 2 | 01024740 | WK-5000 | A43-5000 | YK-135 | R5000L | Attach to R4A |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 | SBB-807 | Not Req. | Horiz. Hold-Panel |
| R5A | 50KΩ | ½ | 01038344 | QJ-485 ** | RTV-424 | | UF54L | Vert. Hold-Rear |
| B | 1 Meg | ½ | | | | | UR16L | Horiz. Drive |
| R6A | 15KΩ | ½ | 01044441 | QII-119 | AG-32-8 | AB-22 | U-26 | Attach to R6A |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 | AK-1 | Not Req. | Damonitor (AGC) |
| R7A | 100KΩ | ½ | 01053800 | QII-128 | AG-49-8 | AB-40 | SU-41 | Attach to R7A |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 | AK-1 | Not Req. | |

Note: Tone control used only in Ch. RA-170 and RA-171.
† CONCENTRIKIT EQUIVALENT - KIT K-2, BASE ELEMENTS & SHAFTS B1J-103 & P6-122 (Panel)
B1T-137X & R1-207 (Rear) & SWITCH 76-1.
** CONCENTRIKIT EQUIVALENT - KIT K-5, BASE ELEMENTS & SHAFTS B1J-123 & P1-028 (Panel)
B1J-137 & R12-108 (Rear)
◆ CONCENTRIKIT EQUIVALENT - KIT K-5, BASE ELEMENTS & SHAFTS B1L-137 & P1-028 (Panel)
B1J-137 & R12-108 (Rear)

## RESISTORS

| ITEM No. | RATING OHMS | RATING WATT | REPLACEMENT DATA DUMONT PART No | IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R8 | 47Ω | | | BTS-470 | |
| R9 | 470Ω | | | BTS-470 | |
| R10 | 10KΩ | | | BTS-10K | |
| R11 | 270Ω | | | BTS-270 | |
| R12 | 3900Ω | | 02031840 | BTS-3900 | |
| R13 | 820KΩ 5% | | 02041160 | BTS-820K 5% | |
| R14 | 470Ω | | 02041730 | BTS-470 | |
| R15 | 1Meg 5% | | 02041200 | | |
| R16 | 10KΩ | | 02031890 | | |
| R17 | 180KΩ | | 02032040 | | |
| R18 | 10KΩ | | 02031890 | | |
| R19 | 10KΩ | | 02031890 | | |
| R20 | 4700Ω | | 02031850 | BTS-4700 | |
| R21 | 270Ω | | | BTS-270 | Note 1 |
| R22 | 33KΩ | | 02031950 | | Note 2 |
| R23 | 2700Ω | 2 | 02037820 | BTB-2700 | |
| R24 | 220KΩ | | 02032050 | BTS-220K | |
| R25 | 240KΩ 5% | | 02031050 | BTS-240K 5% | |
| R26 | 2.2Meg 5% | | 02031280 | BTS-2.2Meg 5% | |
| R27 | 200KΩ 5% | | 02031030 | BTS-200K 5% | |
| R28 | 47KΩ | | 02031970 | BTS-47K | |
| R29 | 47KΩ | | 02031970 | BTS-47K | |
| R30 | 10KΩ | | 02032480 | BTS-10K | |
| R31 | 22KΩ | | 02041930 | BTS-22K | |
| R32 | 5Ω | | 02031620 | BTS-56 | |
| R33 | 1000Ω | | 02032410 | BTS-1000 | |
| R34 | 10KΩ | 2 | 02037890 | BTB-10K | Note 3 |
| R35 | 10KΩ | 2 | 02037890 | BTB-10K | |
| R36 | 47KΩ | 2 | 02037970 | BTB-47K | |
| R37 | 1000Ω | | 02032420 | BTS-1000 | |
| R38 | 1000Ω | | 02032420 | BTS-1000 | |
| R39 | 4700Ω | | 02031850 | BTS-4700 | |
| R40 | 56Ω | | 02031620 | BTS-56 | |
| R41 | 1000Ω | | 02032420 | BTS-1000 | |
| R42 | 1000Ω | | 02032420 | BTS-1000 | |
| R43 | 1000Ω | | 02032420 | BTS-1000 | |
| R44 | 10KΩ | | 02031890 | | |
| R45 | 33Ω | | 02031570 | BTS-22 | |
| R46 | 39Ω | | 02031600 | BTS-39 | |
| R47 | 1000Ω | | 02032420 | BTS-1000 | |
| R48 | 22KΩ | | 02031930 | | Note 4 |
| R49 | 100Ω | | 02031650 | BTS-100 | |
| R50 | 1000Ω | | 02032420 | BTS-1000 | |
| R51 | 5600Ω | | 02031880 | BTS-5600 | |
| R52 | 1Meg | | 02032600 | BTS-1Meg | |
| R53 | 3900Ω 5% | | | BTS-3900 5% | |
| R54 | 3300Ω | | | BTS-3300 | |
| R55 | 680Ω | | 02032410 | BTS-680 | |
| R56 | 4700Ω | | 02031850 | BTS-4700 | |
| R57 | 6800Ω | | | BTS-6800 | Note 1 |
| R58 | 5000Ω | 10 | 02107960 | | |
| R59 | 120KΩ | | 02032020 | BTS-220K | |
| R60 | 270KΩ | | 02032060 | BTS-270K | |
| R61 | 1Meg | | 02032600 | BTS-1Meg | |
| R62 | 100KΩ | | 02032010 | BTS-100K | |
| R63 | 1Meg | | 02032600 | BTS-1Meg | Note 7 |
| R64 | 330KΩ | | 02032070 | BTS-330K | |
| R65 | 5600Ω | | 02031860 | BTS-5600 | |
| R66 | 5600Ω | | 02031880 | BTS-5600 | |
| R67 | 82KΩ | | 02032000 | BTS-82K | |
| R68 | 39KΩ | | 02031960 | BTS-39K | |
| R69 | 39KΩ | | 02031960 | BTS-39K | |
| R70 | 39KΩ | 2 | 02037960 | BTB-39K | |
| R71 | 470KΩ | | 02032090 | BTS-470K | |
| R72 | 510KΩ 5% | | | BTS-510K 5% | |
| R73 | 2700Ω | | | BTS-2700 | |
| R74 | 470KΩ | | 02032090 | BTS-470K | |
| R75 | 680Ω | | 02032410 | BTS-680 | |

| ITEM No. | RATING OHMS | RATING WATT | REPLACEMENT DATA DUMONT PART No | IRC PART No | NOTES |
|---|---|---|---|---|---|
| R76 | 390Ω | | 02031720 | BTS-390 | |
| R77 | 22KΩ | | 02031930 | BTS-22K | |
| R78 | 15KΩ | | 02031910 | BTS-15K | |
| R79 | 15KΩ | | 02031910 | BTS-15K | |
| R80 | 12KΩ 5% | | 02031900 | BTS-12K 5% | Note 7 |
| R81 | 1Meg | | 02032600 | BTS-1Meg | |
| R82 | 1Meg | | 02032600 | BTS-1Meg | |
| R83 | 470KΩ | | 02032580 | BTS-470K | |
| R84 | 100KΩ | | 02032010 | BTS-100K | |
| R85 | 510KΩ 5% | | | BTS-510K 5% | Note 5 |
| R86 | 680KΩ 5% | | 02031160 | BTS-680K 5% | |
| R87 | 220Ω | 2 | 02038380 | | |
| R88 | 22KΩ 5% | 1 | 02033900 | BTA-22K 5% | |
| R89 | 1500Ω 5% | 1 | 02030530 | BTS-1500 5% | |
| R90 | 47KΩ 5% | 2 | 02036880 | BTB-47K 5% | |
| R91 | 220KΩ | | 02032050 | BTS-220K | |
| R92 | 100KΩ | | 02032000 | BTS-100K | |
| R93 | 33KΩ | | 02031950 | BTS-33K | |
| R94 | 680KΩ 5% | | 02031160 | BTS-680K 5% | |
| R95 | 470KΩ 5% | | 02031120 | BTS-470K 5% | |
| R96 | 15Meg | | 02032270 | BTS-15Meg | |
| R97 | 47KΩ | | 02031970 | BTS-47K | |
| R98 | 390Ω | | | BTS-390 | Note 6 |
| R99 | 220KΩ | | 02032050 | BTS-220K | |
| R100 | 100KΩ | 2 | 02038010 | BTB-100K | |
| R101 | 82KΩ | | 02032000 | BTS-82K | |
| R102 | 3.9Meg | | 02032290 | BTS-3.9Meg | |
| R103 | 22Meg | | 02032680 | BTS-22Meg | |
| R104 | 1000Ω | | 02031770 | BTS-1000 | |
| R105 | 680Ω 5% | | 02030440 | BTS-680 5% | |
| R106 | 680Ω 5% | | 02030440 | BTS-680 5% | |
| R107A | 22KΩ | | | BTS-22K | |
| B | 820Ω | | #80000631 | BTS-820 | |
| C | 820Ω | | | BTS-820 | |
| R108 | 820KΩ | | 02032150 | BTS-820K | |
| R109 | 100Ω | | 02032420 | BTS-100 | |
| R110 | 1.2Meg | | 02032140 | BTA-1.2Meg | |
| R111 | 330KΩ | 1 | 02035070 | BTA-330K | |
| R112 | 68KΩ | 1 | 02034990 | BTA-68K | |
| R113 | 15KΩ 5% | | 02030760 | BTS-15K 5% | |
| R114 | 2.2Meg | | 02032620 | BTS-2.2Meg | |
| R115 | 820Ω | | 02032760 | BTA-820 | |
| R116 | 560Ω | | 02041740 | BTS-560 | |
| R117 | 560Ω | | 02041740 | BTS-560 | |
| R118 | 1Ω | | 02034545 | | |
| R119 | 100KΩ | | 02032010 | BTS -100K | |
| R120 | 100KΩ | | 02032010 | BTS-100K | |
| R121 | 4.7Meg | | 02032210 | BTS-4.7Meg | |
| R122 | 680KΩ | | 02032110 | BTS-680K | |
| R123 | 1800Ω 5% | | 02030540 | BTS-1800 5% | |
| R124 | 8200Ω 5% | | 02030700 | BTS-8200 5% | |
| R125 | 47KΩ | | 02031970 | BTS-47K | |
| R126 | 390KΩ | | 02032080 | BTS-390K | |
| R127 | 100KΩ | | 02032010 | BTS-100K | |
| R128 | 220KΩ | | 02032050 | BTS-220K | |
| R129 | 6200Ω 5% | | 02030670 | BTS-6200 5% | |
| R130 | 470KΩ | 1 | 02032580 | BTS-470K | |
| R131 | 33KΩ | | 02032510 | BTS-33K | |
| R132 | 68Ω | | 02031550 | | |
| R133 | 150Ω | | 02121830 | PW4-150 | |
| R134 | 560Ω | 4 | 02121630 | | Note 7 |
| R135 | 15KΩ | 2 | 02037910 | BTB-15K | |
| R136 | 15KΩ | 2 | 02037910 | BTB-15K | |
| R137 | 3500Ω | 2 | 02037830 | BTB-3300 | |
| R138 | 1.8Ω | ½ | 02100710 | | |
| R139 | 330KΩ | 1 | 02035570 | | |
| R140 | 4000Ω | 10 | 02113050 | 13/4A-4000 | |
| R141 | 47KΩ | 1 | 02034970 | BTA-47K | |
| R142 | 100KΩ | 1 | 02035540 | BTA-100K | |

†Note 1. Not used in all Models.
Note 2. Some Models may use a 47KΩ resistor in this application.
Note 3. Some Models may use a 12KΩ resistor in this application.
Note 4. Some Models may use a 3300Ω resistor in this application.
Note 5. Some Models may use a 680KΩ resistor in this application.
Note 6. Some Models may use a 39KΩ resistor in this application.
Note 7. Used only in Ch. RA-170 & RA-171.
◆ Items R107A, R107B, R107C, C84A, C84B, C84C are combined in one unit.

## TRANSFORMER (POWER)

| ITEM No. | RATING PRI. | RATING SEC. 1 | RATING SEC. 2 | RATING SEC. 3 | REPLACEMENT DATA DUMONT PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. | RCA TYPE No. |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 117VAC ① 1.9A | 580VCT ② .250ADC | 5VAC ⑤ 4A | 6.3VAC ⑤ 1.4A | 20008183 | | P-3058D ③ | | R-61BC ③ | |

① Drill new mounting holes.
② Parallel the two 6.3V windings and use as Sec. 3.

## TRANSFORMER (SWEEP CIRCUITS)

| ITEM No. | RATING DC RESISTANCE PRI. | RATING DC RESISTANCE SEC. | REPLACEMENT DATA DUMONT PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. | RCA TYPE No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| T2 | 422Ω tap ④ 22Ω | 36.8Ω tap ③-3.6Ω, 11.6Ω | 20008061 | | HVO-9 ① ② | TFB-13 ③ ④ | D-19 ④ | 225T1 ④ | Horiz. Output Trans. |
| | | SEC. 2 0Ω | | | | | | | |
| T3 | 1500Ω tap ④ 6Ω | | 20008481 20008021 ⑦ | A-8141 | A-3039 | TSO-12 | A-104X | 226T1 | Vert. Output Trans. |
| T4A B | 43Ω 53Ω | | 21011062 | DY-11 A ⑤ | | TY-7 | Y-32 | | Horiz. Deflection Coils Vert. Deflection Coils |

## TRANSFORMER (SWEEP CIRCUITS)

| ITEM No. | RATING DC RESISTANCE PRI. | RATING DC RESISTANCE SEC. | REPLACEMENT DATA DUMONT PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. | RCA TYPE No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| T5 | 5.7Ω | | 21011001 | | MWC-5 | TL-3 ⑥ | | | Horiz. Linearity Coil |
| | tap ④ 1.5Ω | | | | | | | | |
| T6 | 6Ω | | 21011011 | | MWC-6 | TW-7 | WC-12 ⑤ ⑦ | | Width Coil |

① Drill one new mounting hole.
② Connect linearity coil in plate circuit of 6AX4
③ Drill new mounting holes.
④ Wire as in original circuit.
⑤ Use original horiz. deflection network if necessary.
⑥ Enlarge mounting hole.
⑦ Connect to coded blue and red terminals.
⑧ Alternate vert. output trans.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING IMPEDANCE PRI. | RATING IMPEDANCE SEC. | RATING DC RES PRI. | RATING DC RES SEC. | REPLACEMENT DATA DUMONT PART No | STANCOR PART No | MERIT PART No | CHICAGO PART No | TRIAD PART No | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| T7 | 3.4KΩ | 3.9Ω | 182Ω | .31Ω | Part of Spkr. | A-3825 | A-3018 | RO-305 | S-4X | |

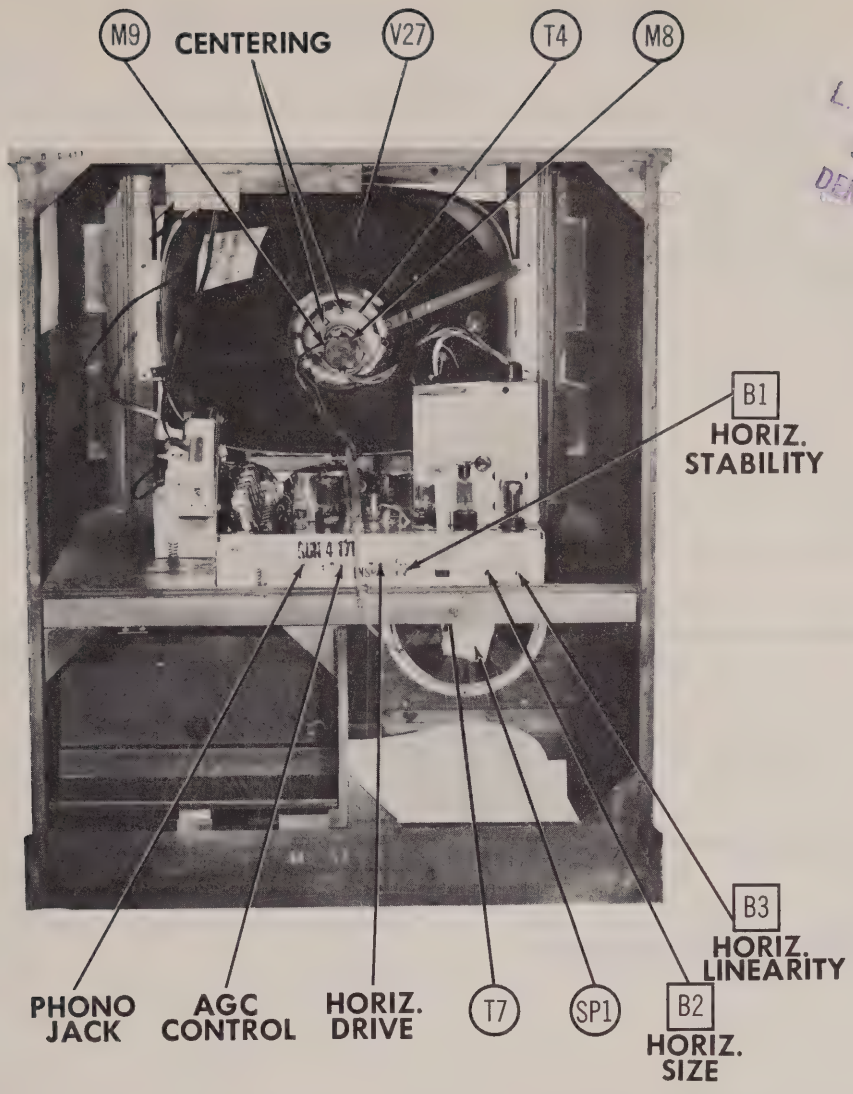
## SPEAKER

| ITEM No. | RATINGS SIZE | RATINGS FIELD | RATINGS V. C. IMP. | REPLACEMENT DATA DUMONT PART No. | VIKING PART No. | QUAM PART No | NOTES |
|---|---|---|---|---|---|---|---|
| SP1 | 10" | PM | 3.9Ω | 18003501 32003481 ① 18003511 ② 18003521 ③ | 107JI 574 | 10A4A 5AJ | ① Alternate 10" PM speaker ② 10" PM speaker used in Model 17T350 ③ 5" PM Speaker used in Model 17T350 |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. PRI. | DC RES. SEC. | REPLACEMENT DATA DUMONT PART No. | MEISSNER PART No | MERIT PART No. | MILLER PART No | NOTES |
|---|---|---|---|---|---|---|---|---|
| L1 | Ant., Coupling Loop | 0Ω | | | | | | |
| L2 | RF Coupling | 0Ω | | | | | | |
| L3 | Osc.Coupling | 0Ω | | | | | | |
| L4 | Osc.Harmonic Coupling | 0Ω | | | | | | |
| L5 | Osc.Tank Coil | 0Ω | | | | | | |
| L6 | Osc. Coil | 0Ω | | | | | | |
| L7 | Osc. Tank Coil | 0Ω | | | | | | |
| L8 | Fil. Choke | 0Ω | | 21011831 | | | | |
| L9 | RF Choke | .1Ω | | 21011821 | | | | |
| L10 | IF Output Coil | 0Ω | | 21011841 | | | | |
| L11A | Ant., RF, Mixer Grid & Osc. Coil | 0Ω | | 40014881 | | | | Channel 2 |
| B | Ant., RF, Mixer Grid & Osc. Coil | 0Ω | | 40014882 | | | | Channel 3 |
| C | Ant., RF, Mixer Grid & Osc. Coil | 0Ω | | 40014883 | | | | Channel 4 |
| D | Ant., RF, Mixer Grid & Osc. Coil | 0Ω | | 40014884 | | | | Channel 5 |
| E | Ant., RF, Mixer Grid & Osc. Coil | 0Ω | | 40014885 | | | | Channel 6 |
| F | Ant., RF, Mixer Grid & Osc. Coil | 0Ω | | 40014886 | | | | Channel 7 |
| G | Ant., RF, Mixer Grid & Osc. Coil | 0Ω | | 40014887 | | | | Channel 8 |
| H | Ant., RF Mixer Grid & Osc. Coil | 0Ω | | 40014888 | | | | Channel 9 |
| I | Ant., RF, Mixer Grid & Osc. Coil | 0Ω | | 40014889 | | | | Channel 10 |
| J | Ant., RF, Mixer Grid & Osc. Coil | 0Ω | | 40014891 | | | | Channel 11 |
| K | Ant., RF, Mixer Grid & Osc. Coil | 0Ω | | 40014892 | | | | Channel 12 |
| L | Ant., RF, Mixer Grid & Osc. Coil | 0Ω | | 40014893 | | | | Channel 13 |
| M | UHF 40MC IF Strip | 0Ω | | 40014895 | | | | Includes 2.2KΩ resistor, used in Ch.RA-171 only |
| L12 | Neutr.Coil | 0Ω | | 21011811 | | | | |
| L13 | Fil. Choke | 0Ω | | 21011561 | | | | |
| L14 | Feedback Coil | 0Ω | | 21011571 | | | | |
| L15 | RF Choke | 0Ω | | 21011581 | | | | |
| L16 | Conv. Plate | 0Ω | 0Ω | 21011601 | | | | |
| L17 | Trap Coil | 1.8Ω | | 21011062 | | | 4612 | 11.5 Microhenries, Includes 100MMF Cap. |
| L18 | 1st.Video IF | .1Ω (Tapped) | | 20008231 | | | | |
| L19 | Fil. Choke | .1Ω | | 21008972 | | | 4606 | 2.1 Microhenries |
| L20 | 2nd.Video IF | .1Ω | | 20008241 | | | 6234 a | Includes 100MMF Cap. |

DUMONT MODELS RA-166, RA-167, RA-170, RA-171




CABINET-REAR VIEW

L. F.
DENVER, COLORADO



## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to the center of its range.

Short the AFC test point (pin 1 of V21) to chassis.

Adjust the horizontal stabilizer slug (B1) until the picture synchronizes momentarily. Remove the short from the AFC test point.

The presence of a vertical white line in the center of the picture indicates improper adjustment of the horizontal drive control.

Turn the control until the white line just disappears.

Adjust the horizontal size slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.

# TROUBLE SHOOTING AIDS

## SWEEP

### HORIZONTAL

**LOSS OF SWEEP**

Follow procedure outlined under "Loss of High Voltage".

**INSUFFICIENT SWEEP**

Check adjustment of horizontal size and linearity controls. Substitute V21, V22 and V23. Check waveform W19.

| If Unsatisfactory | If Satisfactory |
|---|---|
| Check coupling and waveshaping network between V21 and V22. | Check components of V22, especially C104. Check Boost B+ and associated components, particularly C107 and C108 . |

**DRIVE LINES**

Check setting of drive control. Check coupling and waveshaping network between V21 and V22.

**COMPRESSED AT LEFT SIDE**

Check setting of linearity control. Substitute V22 and V23. Check all associated components.

**FOLDS**

Substitute V22 and V23. Check associated components, particularly T2 and T4A.

### VERTICAL

**LOSS OF SWEEP**

Substitute V18 and V19. Check waveform W13.

| If Unsatisfactory | If Satisfactory |
|---|---|
| Check all components of V18. Check coupling and waveshaping network between V18 and V19. | Check all components of vertical output stage including T3 and T4B. |

**INSUFFICIENT SWEEP**

Follow procedure outlined under "Loss of Sweep".

**POOR VERTICAL LINEARITY**

Check setting of vertical linearity control. Substitute V19. Check coupling and waveshaping network between V18 and V19. Check cathode circuit of V19.

## SYNC

### HORIZONTAL

**LOSS OF SYNC**

Substitute V20 and V21. Check horizontal stabilizer-control on rear of chassis. Check waveform W18.

| If Unsatisfactory | If Satisfactory |
|---|---|
| Check all components of V20 and V21A. Check coupling network between V20 and V21A. Check plate circuit components of V21A. Check C101. | Check all components of V21B. Check coupling and waveshaping of network between V21B and V22. |

**CRITICAL SYNC**

Follow procedure outlined under "Loss of Sync".

**PULLING PICTURE**

Substitute V20 and V21. Check components of horizontal phase detector and oscillator.

### VERTICAL

**LOSS OF SYNC**

Substitute V18. Check waveform W11.

| If Unsatisfactory | If Satisfactory |
|---|---|
| Check integrating network. Substitute V17 and check associated components. | Check all components of vertical oscillator. |

**CRITICAL SYNC**

Follow porcedure outlined under "Loss of Sync".

## VIDEO

**LOSS OF VIDEO**

Substitute V9 and check associated components. Check picture tube.

**SOUND BARS**

Check local oscillator adjustment. Check video IF alignment.

**POOR RESOLUTION**

Check alignment of tuner and video IF stages. Substitute V9 and check associated components.

**POOR CONTRAST**

Check by subsitution V6, V7, V8 and V9. Check associated components. Check picture tube.

**ONE BLACK BAR ACROSS PICTURE**

Check tuner, video IF, video detector and video amplifier tubes for heater to cathode leakage.

## AUDIO

**WEAK OR NO SOUND**

Check by substitution V12, V13, V14 and V15. Check speaker plug. Check audio output transformer. Check audio system by applying signal from audio generator to grid of V14. If signal gets through check components of V12 and V13. Check adjustment of ratio detector. If signal does not get through check components of audio stages.

**BUZZ**

Adjust discriminator secondary for minimum buzz. Substitute V12 and V13. Check local oscillator setting. Check alignment of sound IF.

**DISTORTED**

Substitute V12, V13, V14 and V15. Check fine tuning. Check alignment of ratio detector. Check all components of sound strip.

# TROUBLE SHOOTING AIDS (CONT.)

## HIGH VOLTAGE

**LOSS OF HIGH VOLTAGE**

Check 1/4 Amp. fuse located in the high voltage cage. Check by substitution V21, V22, V23 and V24. Check waveform at W19.

| If Not Satisfactory | If Satisfactory |
|---|---|
| Check all components of V21 especially the coupling capacitor C103. | Check components of V22, V23 and V24, particularly, T2, T4A, T6 and high voltage filter network Check C107 by pulling V23, if picture with heavy horizontal foldover and reduced in size appears, replace C107. |

**INSUFFICIENT HIGH VOLTAGE**

Follow procedure outlined under "LOSS OF HIGH VOLTAGE".

**BLOOMING**

Follow procedure outlined under "LOSS OF HIGH VOLTAGE". Check R139 for increased resistance. Follow procedure outlined under "SET DEAD".

## POWER

**SET DEAD**

Substitute V25 and V26. Check interlock. Check T1 and other components of B+ circuit.

**DIM PICTURE**

Follow procedure outlined under "SET DEAD" and "LOSS OF HIGH VOLTAGE". Check picture tube.

## GENERAL

**RASTER BUT NO PICTURE OR SOUND, BRIGHTNESS OK**

Check by substitution V2, V3, V4, V5, V6, V7, V8 and V15. Check associated components and alignment.

**NO PICTURE NO SOUND BRIGHTNESS LOW**

Substitute V9. Check associated components.

**INTERMITTENT STREAKS**

Check high voltage circuit for corona arcing and discharge.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this receiving equipment.

# SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF Tuner Oscillator Circuit may accomplished by removing the Channel Selector and Fine Tuning knobs.

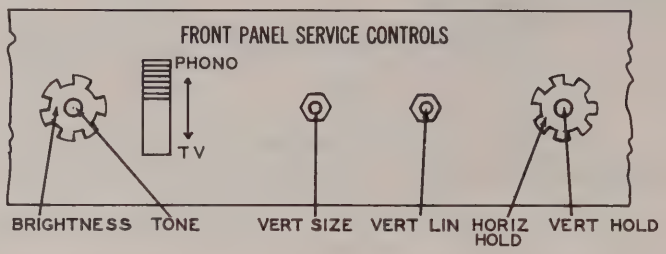
PICTURE TUBE SAFETY GLASS CLEANING

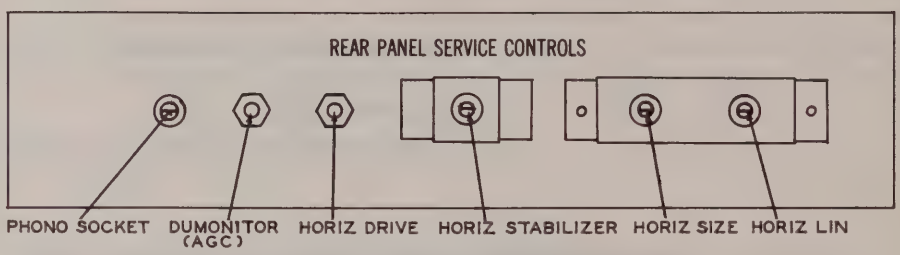
For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassemby instructions).

SERVICE ADJUSTMENT LOCATION




SPECIAL ADJUSTMENTS-DUMONITOR (AGC) ADJUSTMENT-REAR APRON OF CHASSIS

The Dumonitor (AGC) control is properly adjusted at the factory and will not normally require readjustment. To adjust the AGC control to prevent overload on very strong signals the following procedure should be used:

1. Set the horizontal hold for maximum straightness of vertical elements of test pattern near the top of picture.
2. Adjust the AGC control until any overload is eliminated.
3. Switch monentarily to another channel and back again.
4. If overload reappears in step 3 readjust the AGC control to correct the condition.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the Horiz. Oscillator Circuit can be made from the rear panel of the chassis. Set the Horiz. Hold Control at the mid-position of its range and adjust the Horiz. Stabilizer slug until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector Buzz, adjust the Ratio Detector Secondary, L37, located on top of chassis. (See tube placement chart).

FUSES

One fuse is used for Horiz. Sweep Circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

ION TRAP MAGNET SHUNT

In some receivers a small magnetic shunt may be found clipped to the Ion trap magnet. When making adjustments of the Ion Trapmagnet this shunt should not be disturbed.

# DISASSEMBLY INSTRUCTIONS

1. Remove 5 push on type control knobs from front panel.
2. Remove 4 wood screws. Remove rear cover.
3. Disconnect built-in antenna.
4. Remove 2 wood screws. Remove VHF-UHF antenna bracket.
5. Disconnect speaker plug, yoke plug, CRT socket, HV lead and ground strap.
6. Remove 4 chassis bolts. Remove chassis. CRT mounted in cabinet.
7. Remove 4 speaker nuts. Remove speaker.

# PARTS LIST AND DESCRIPTIONS (Continued)

## COILS (CONT.)

| ITEM No. | USE | DC RES. PRI. | DC RES. SEC. | REPLACEMENT DATA: DUMONT PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|
| L21 | Fil. Choke | .1Ω | | 21008972 | | | 4606 | 2.1 Microhenries |
| L22 | 3rd. Video IF | .1Ω | | 20008251 | 17-4504 * | | 6233 ■ | Includes trap & 100MMF Cap. |
| L23 | Fil. Choke | .1Ω | | 21008972 | | | 4606 | 2.1 Microhenries |
| L24 | 4th. Video IF | .1Ω | .6Ω | 20008261 | | | 6234 ■ | Includes 100MMF Cap. |
| L25 | Fil. Choke | .1Ω | | 21008972 | | | 4606 | 2.1 Microhenries |
| L26 | 5th Video IF | .1Ω | .6Ω | 20008303 | | | 6234 ■ | Includes 100MMF Cap. |
| L27 | Series Peaking Coil | 1.3Ω | | 21011301 | | | 4612 | 10 Microhenries |
| L28 | Shunt Peaking Coil | 1.8Ω | | 21011082 | | | 4612 | 11.5 Microhenries |
| L29 | Shunt Peaking Coil | 10Ω | | 21006627 | 19-1923 | TV-188 | 4648 | 370 Microhenries |
| L30 | Series Peaking Coil | 9Ω | | 21006624 | 19-3160 | TV-184 | 6180 | 166 Microhenries |
| L31 | Series Peaking Coil | 7.5Ω | | 21006624 | 19-3160 | TV-184 | 6180 | 166 Microhenries, Not used in all Models |
| L32 | Shunt Peaking Coil | 14Ω | | 21006627 | 19-1923 | TV-188 | 4648 | 370 Microhenries |
| L33 | 4.5MC Trap | 2.1Ω | | 21010961 | 20-1004 | TV-151 | 1470 | |
| L34 | Series Peaking Coil | 1.8Ω | | 21011082 | | | 4612 | 11.5 Microhenries |
| L35 | Sound IF Coupling | 1.8Ω | | 21011082 | | | 4612 | 11.5 Microhenries |
| L36 | Sound IF | 6.5Ω | | 21011021 | 17-3400 | TV-151 | 1469 | |
| L37 | Ratio Det. | 5Ω | .8ΩCT | 20006141 | 17-3497 † | TV-115 † | 6205 † | Tertiary Windings -.7Ω |
| L38 | RF Choke | .6Ω | | 21006230 | 19-3001 | TV-189 | 6175 | .82 Microhenry, (IRC part #CLA) |
| L39 | RF Choke | .6Ω | | 21006230 | 19-3001 | TV-189 | 6175 | .82 Microhenry, (IRC part #CLA) |
| L40 | RF Choke | .6Ω | | 21006230 | 19-3001 | TV-189 | 6175 | .82 Microhenry, (IRC part #CLA) |
| L41 | Horiz. Osc. | 55Ω | | 21010991 | 19-1576 | TV-163 | 6210 | |
| L42 | RF Choke | 2.8Ω | | 21006520 | | | 4608 | 4.7 Microhenries (IRC part #CL-1) |
| L43 | RF Choke | 1.8Ω | | 21006280 | | | 4606 | 2.2 Microhenries (IRC part #CLA) |

* Add 100MMF Cap. externally.
■ Add 100MMF Cap. externally and use adaptor plate.
† Use adaptor plate
▲ Use on winding only, add 100MMF Cap. externally and use adaptor plate.

## FILTER CHOKE

| ITEM No. | RATINGS: TOTAL DIRECT CURRENT | RATINGS: D. C. RESISTANCE | RATINGS: INDUCTANCE (0 CURRENT 1000 ~) | REPLACEMENT DATA: DUMONT PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. |
|---|---|---|---|---|---|---|---|---|
| L44 | .250ADC | 41Ω | 1.5 Hy. | 21010952 | C-2326 ① | C-2996 | TR-1733 | C-23X ① |

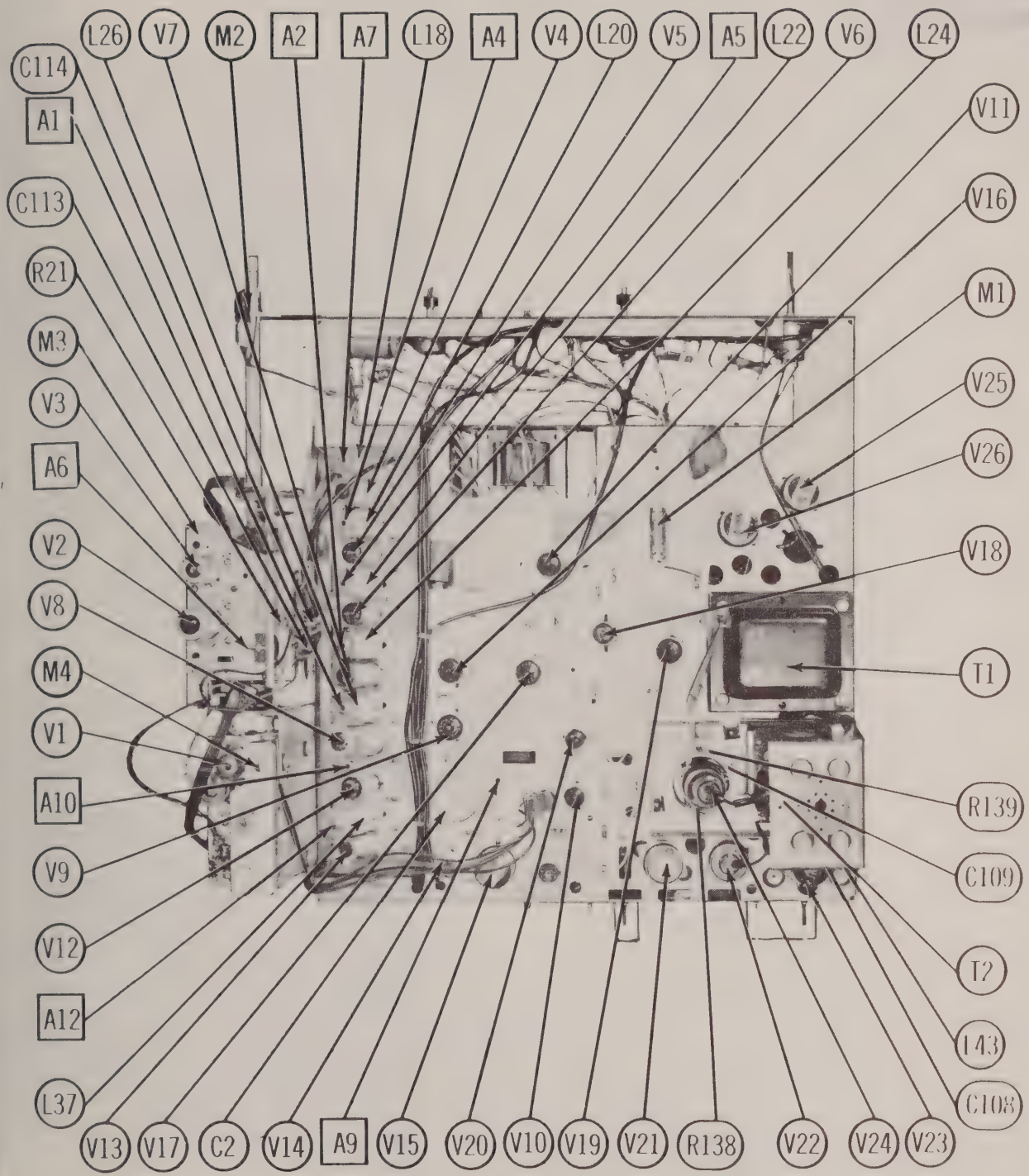
① Drill one new mounting hole.

## FUSES

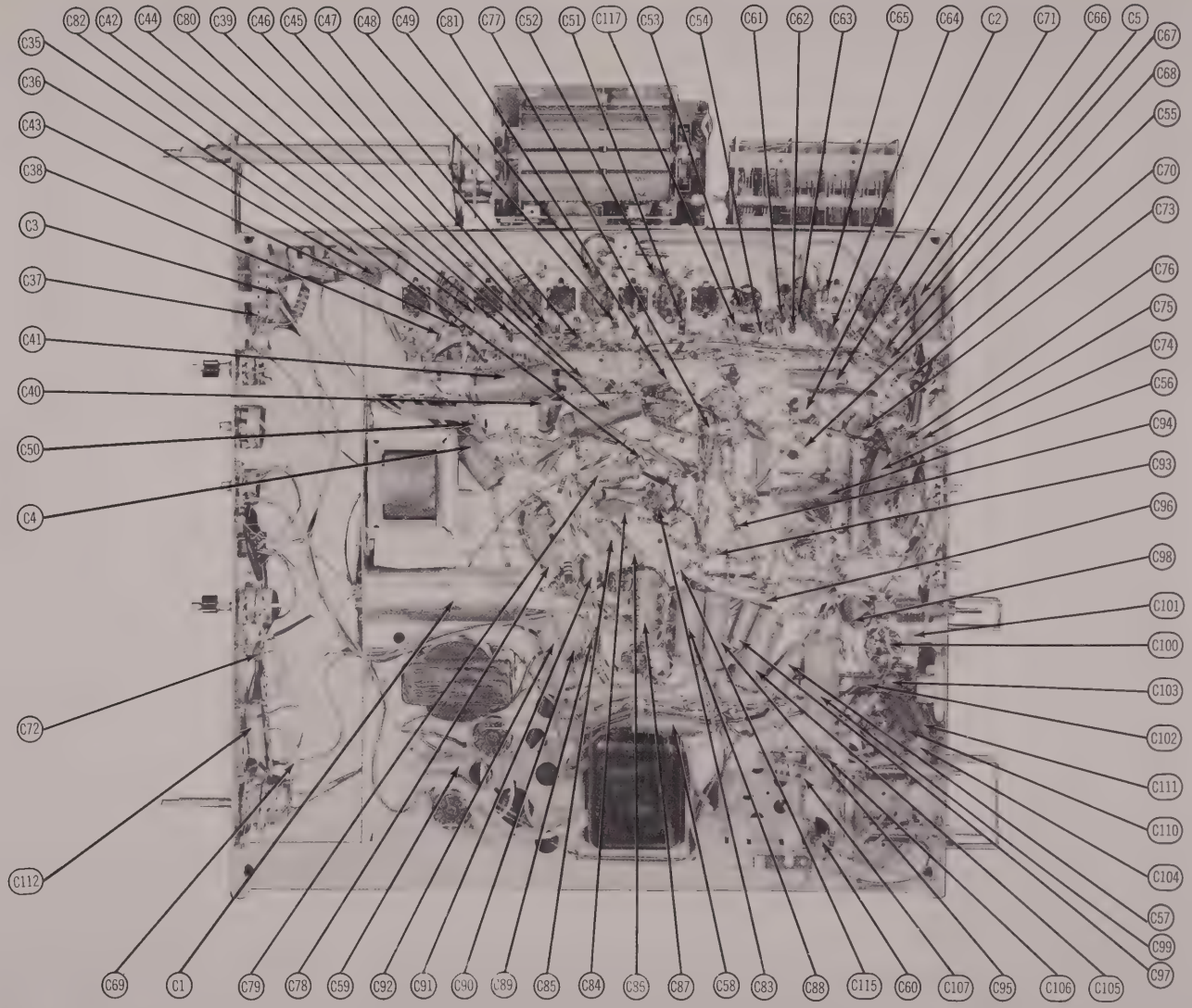
| ITEM No. | TYPE | RATING | REPLACEMENT DATA: DUMONT PART No. FUSE | DUMONT PART No. HOLDER | LITTELFUSE PART No. FUSE | LITTELFUSE PART No. HOLDER | BUSS PART No. FUSE | BUSS PART No. HOLDER |
|---|---|---|---|---|---|---|---|---|
| M1 | 3AG | 1/4Amp 250V | 11000720 | 11000600 | 312.250 (3AG-1/4A) | 357001 | AGC-1/4 | 4405 |

## MISCELLANEOUS

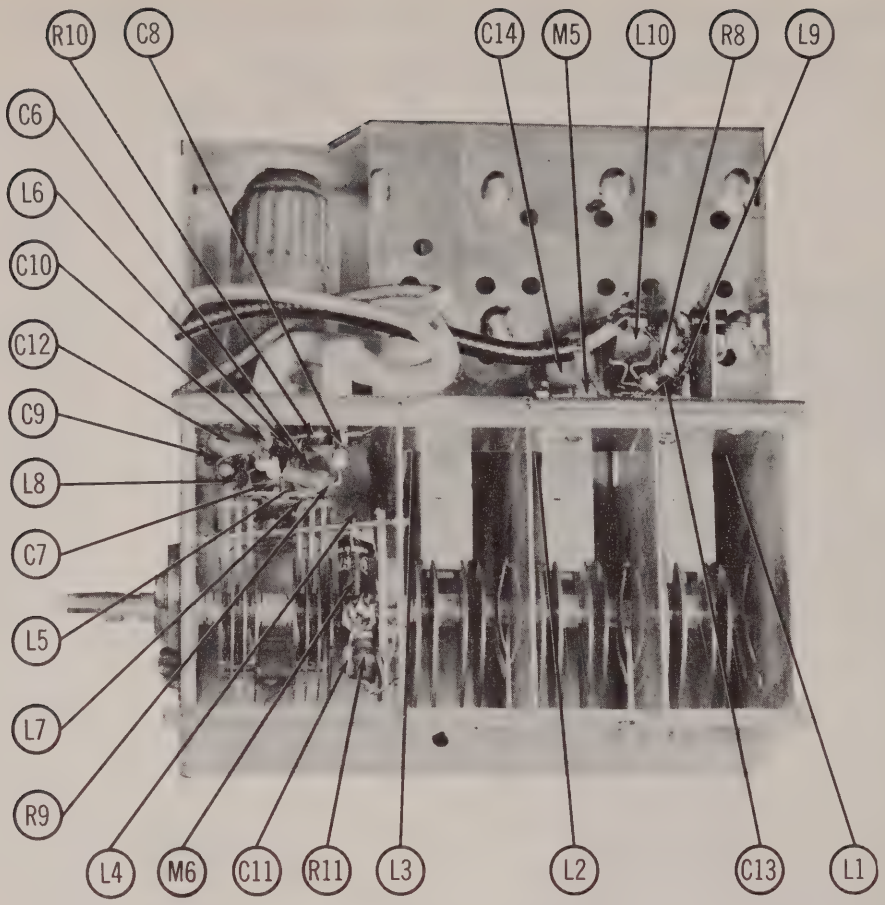
| ITEM No. | PART NAME | DUMONT PART No. | NOTES |
|---|---|---|---|
| M2 | Dial Light | 12001310 | Type #47 (Not used in all Models) |
| M3A | RF Tuner | 8901291I | VHF, Models 21T376U, 21T377U and 21T378U |
| B | RF Tuner | 89012901 | VHF, Model 17T350, 21T327, 21T328, 21T329, 21T359, 21T366, 21T376, 21T377 and 21T378 |
| M4 | RF Tuner | 89012921 | UHF, Models 21T376U, 21T377U and 21T378U |
| M5 | Crystal Diode | 26001082 | UHF Mixer (1N82) |
| M6 | Crystal Diode | 26001082 | Harmonic Generator (1N82) |
| M7 | Switch | 05005120 | TV-Phono Selector (Not used in all Models) |
| M8 | Centering Magnet | 29000651 | |
| M9 | Ion Trap | 29000661 | |
| | Safety Glass | 45004061 | Model 17T350 |
| | Safety Glass | 45004001 | All Models except 17T350 |
| | Mask Assembly | 64006608 | Brown, Model 17T350 |
| | Mask Assembly | 64006609 | Green, Model 17T350 |
| | Mask Assembly | 64006763 | Gold, All Models except 17T350 |
| | Mask Assembly | 64006764 | Brown, All Models except 17T350 |
| | Control Cover | 42006662 | Mahogany |
| | Control Cover | 42006663 | Blonde |
| | Knob | 45004431 | Channel Selector, Mahogany |
| | Knob | 45004432 | Channel Selector, Blonde |
| | Knob | 45004441 | Fine Tuning |
| | Knob | 45004442 | Contrast |
| | Knob | 45004451 | Off/On Volume, Mahogany |
| | Knob | 45004452 | Off/On Volume, Blonde |



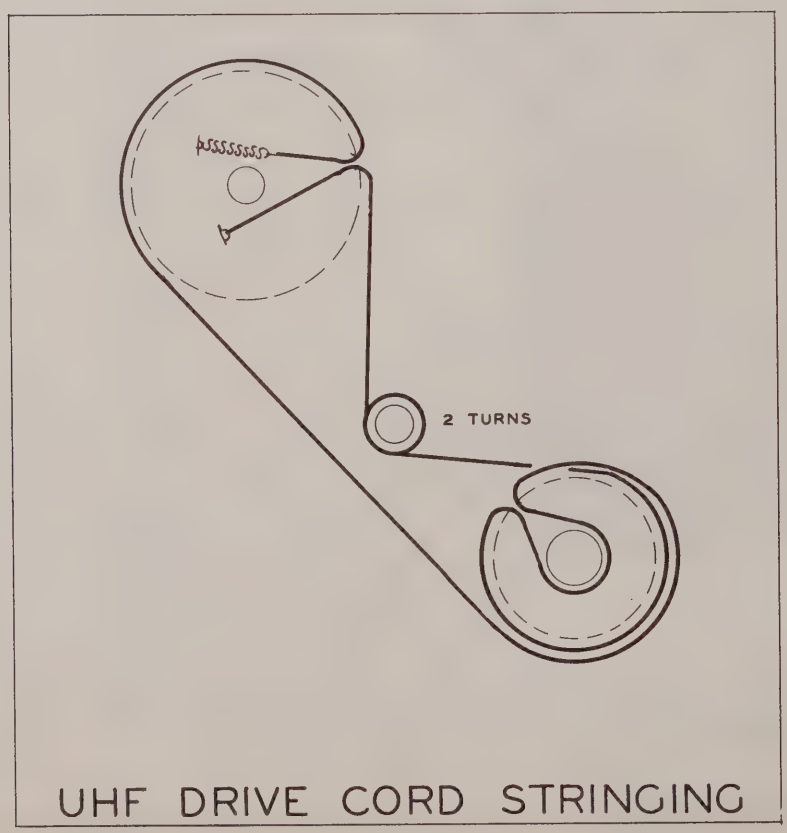

CHASSIS TOP VIEW




CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION




UHF TUNER




UHF DRIVE CORD STRINGING

# PRODUCTION CHANGES

| CHASSIS | SERIAL No. |
|---|---|
| RA-166/167 | 666426 |
| RA-168/169 | 681 |
| RA-170 | 701 |
| RA-171 | 711 |

Reason: To eliminate high audio frequency harmonics present on the 130 volt line. In some cases these harmonics enter other stages of the receiver causing streaks in the picture.

Procedure: A 5000MMF ceramic capacitor was connected from pin 8 to ground of the audio output tube, V15. This change is shown as C76 in the schematic on Page 2.

| CHASSIS | SERIAL No. |
|---|---|
| RA-166/167 | 666972 |
| RA-168/169 | 681 |
| RA-170 | 70966 |
| RA-171 | 711 |

(Coded Run 1)

Reason : To reduce radiation of harmonics of the Sound and Video IF signals, generated in the Video Detector and Sound Converter, V8. Under some conditions these harmonics signals enter the tuner causing interference in the picture. A 12AU7 dual triode is used in place of the 6AL5 dual diode. The triode sections operate as diodes with the grids acting as the diode plates. The triode plates are used as shields to reduce radiation.
The sound converter section plate is grounded directly. The video detector section plate is grounded through a parallel RC network. The network places the plate at ground potential to RF, while avoiding the loading effect on the video detector which would occur if the plate were grounded directly.
The 6AL5 circuit, which was used in earlier production, is shown in Fig. 1 below. The 12AU7 circuit, which is used in later production is shown in Fig. 2 below.

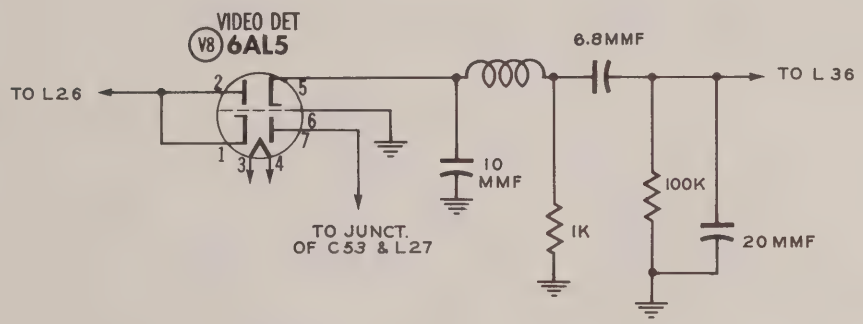



FIGURE 1

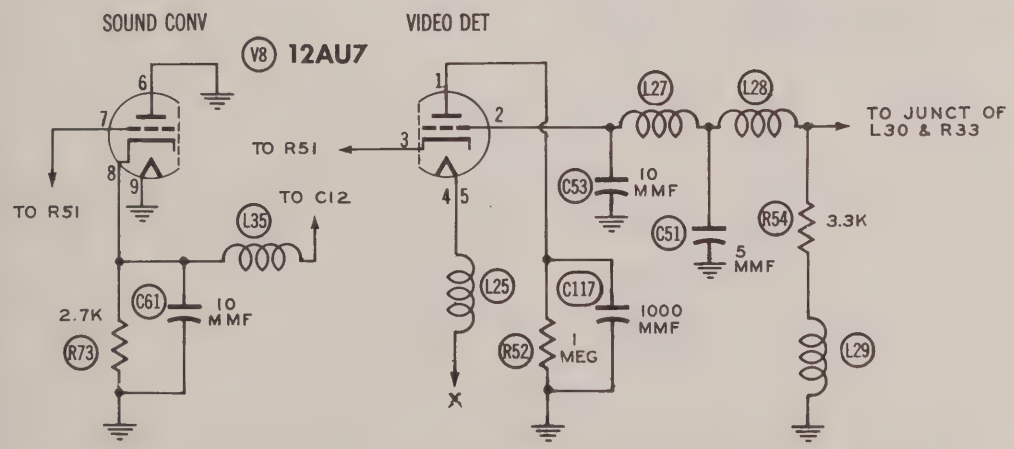



FIGURE 2

# PRODUCTION CHANGES (CONT.)

| CHASSIS | SERIAL No. |
|---|---|
| RA-166/167 | 668401 |
| RA-168/169 | 68795 |
| RA-170 | 7014100 |
| RA-171 | 71121 |

(Coded Run 2)

Reason: To reduce the possibility of regeneration in Models equipped with a UHF tuner. An RC decoupling network has been added between the 130 volt line and the tuner. This is shown as C114, C115 and R21 in the schematic on Page 2. To eliminate RF components in the tuner filament circuit, a 1000MMF by-pass capacitor was added from the tuner filament lead to ground. This capacitor is shown as C113 in the schematic on Page 2.

| CHASSIS | SERIAL No. |
|---|---|
| RA-166/167 | 6614876 |
| RA-168/169 | 68795 |
| RA-170 | 7014100 |
| RA-171 | 71121 |

(Coded Run 2)

Reason: To increase the long term stability of the vertical oscillator. C91, vertical feedback capacitor, was changed from 2000MMF to 2200MMF. This change is shown in the schematic on Page 2.

| CHASSIS | SERIAL No. |
|---|---|
| RA-166/167 | 6619556 |
| RA-168/169 | 681901 |
| RA-170 | 7025737 |
| RA-171 | 719001 |

(Coded Run 5)

Reason: To provide a field adjustment of the RF AGC delay in order to obtain improved strong and very weak signal performance. The new control is named the Super Dumonitor. A partial schematic showning this circuit is given in Fig. 3 below.

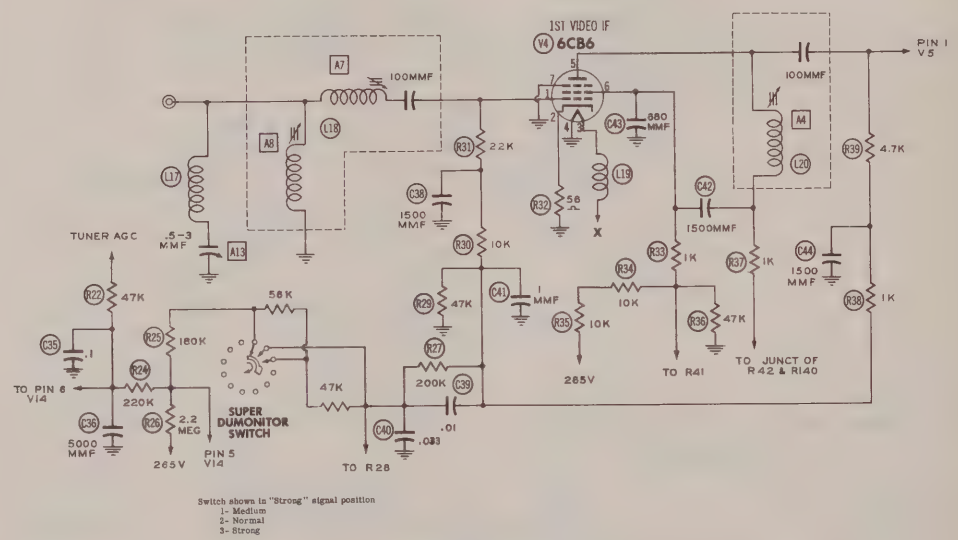



FIGURE 3

| CHASSIS | SERIAL No. |
|---|---|
| RA-166/167 | 6619866 |
| RA-168/169 | 681901 |
| RA-170 | 7027381 |
| RA-171 | 719501 |

(Coded Run 5)

Reason: To improve the horizontal lock in range and minimize the possibility of overload in the 4th. Video IF stage.

Procedure:

1. Replace C40, the AGC filter capacitor (see Fig. 3), with a .033MF 20% 200V capacitor.
2. Replace R49 in the cathode circuit of V7 with a 180Ω 10% ½W resistor.
3. Replace R50 in the plate circuit of V7 with a 470Ω 10% 1/3W resistor.

| CHASSIS | SERIAL No. |
|---|---|
| RA-166/167 | 6618456 |
| RA-168/169 | 681201 |
| RA-170 | 7023315 |
| RA-171 | 716174 |

(Coded Run 4)

PROPERTY OF L. F. [illegible] 39[illegible] DENVER, COLORADO

**Reason:** To improve the picture quality and weak signal sound performance.

**Procedure:** A sound trap was added in the grid circuit of the 1st. Video IF Amplifier. This is shown as A13 in the schematic in Fig. 3 The Video Amplifier plate load and sync take-off circuits were also changed. A partial schematic of the circuit originally used is given in Fig. 4 below. A partial schematic of the c ircuit used in later production is given in Fig. 5 below. Then these changes were made the Video IF Alignment was also changed. An alignment chart for set incorporating these changes is given on page 20.

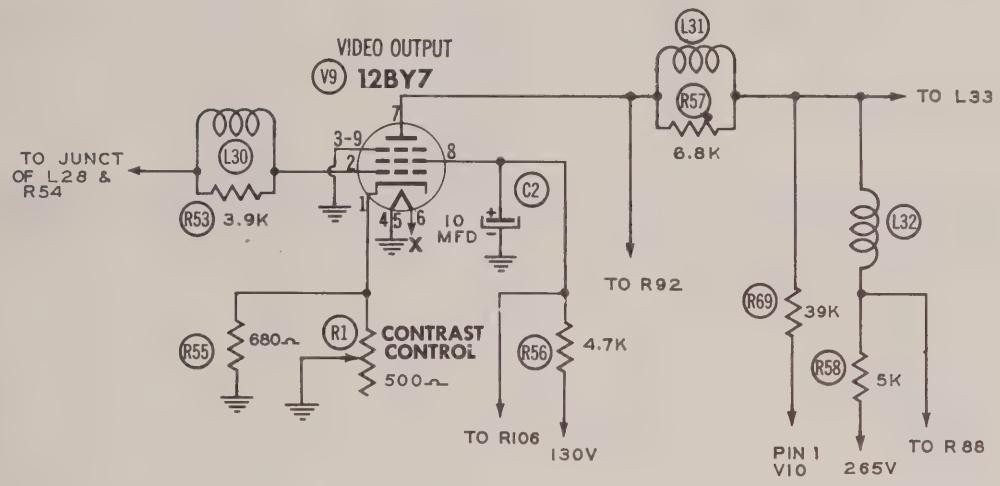



FIGURE 4

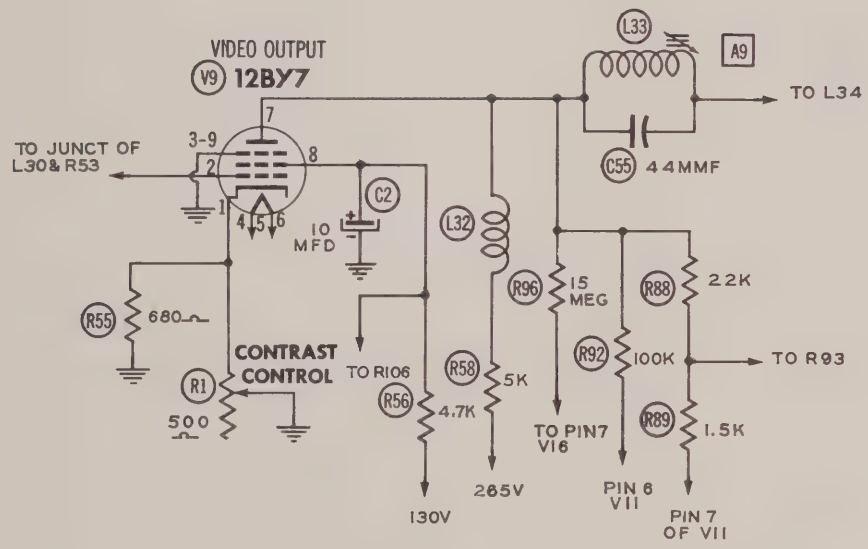



FIGURE 5

# PRODUCTION CHANGES (CONT.)

VIDEO IF ALIGNMENT

Remove the converter tube, V3, from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications. Connect the negative lead of a 3 volt battery to the AGC test point. Connect the positive lead to chassis. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | Direct | High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis | Not used | 44.25MC | Any | Vert. Amp. to point (A). Low side to chassis. | A1 | Adjust for maximum deflection. Attenuate generator to maintain VTVM reading on lowest range. |
| 2. | " | " | " | 42.0MC | " | " | A2 | " |
| 3. | " | " | " | 46.1MC | " | " | A3 | " |
| 4. | " | " | " | 44.25MC | " | " | A4 | " |
| 5. | " | " | " | 47.25MC | " | " | A5 | Adjust for MINIMUM deflection. |
| 6. | " | " | 43.5MC (10MC Swp) | 42.5MC 44.8MC | " | Vert. Amp. thru detector (Fig. 1) to pin 5 (plate) of 6CB6 (V4). Low side to chassis. | A6, A7, A8 | Adjust A6 and A7 to place 44.65MC marker on one peak of response curve similar to Fig. 6 . Adjust A8 to place 42.6MC marker on other peak. Adjust A13 for 41.25MC dip. |
| 7. | .01MFD | High side to point (A). Low side to chassis. | Not used | 4.5MC (400~Mod) | " | Vert. Amp. thru detector (Fig. 1) to pin 11 (cathode) of picture tube. Low side to chassis. | A9 | Adjust for MINIMUM 400~ indication on scope. |

8. Replace the original 6J6 converter tube in its socket and remove bias battery. If the horizontal oscillator tube, V21, was removed to disable the high voltage, replace it, restoring the set to normal operation. Tune to the best TV signal available, preferably a test pattern. Adjust the fine tuning control until sound in the picture is eliminated. Examine picture for trailing whites or smear. If either condition is noted, adjust A7 not more than 1/2 turn to eliminate the condition.

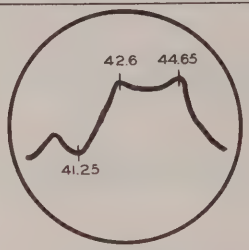
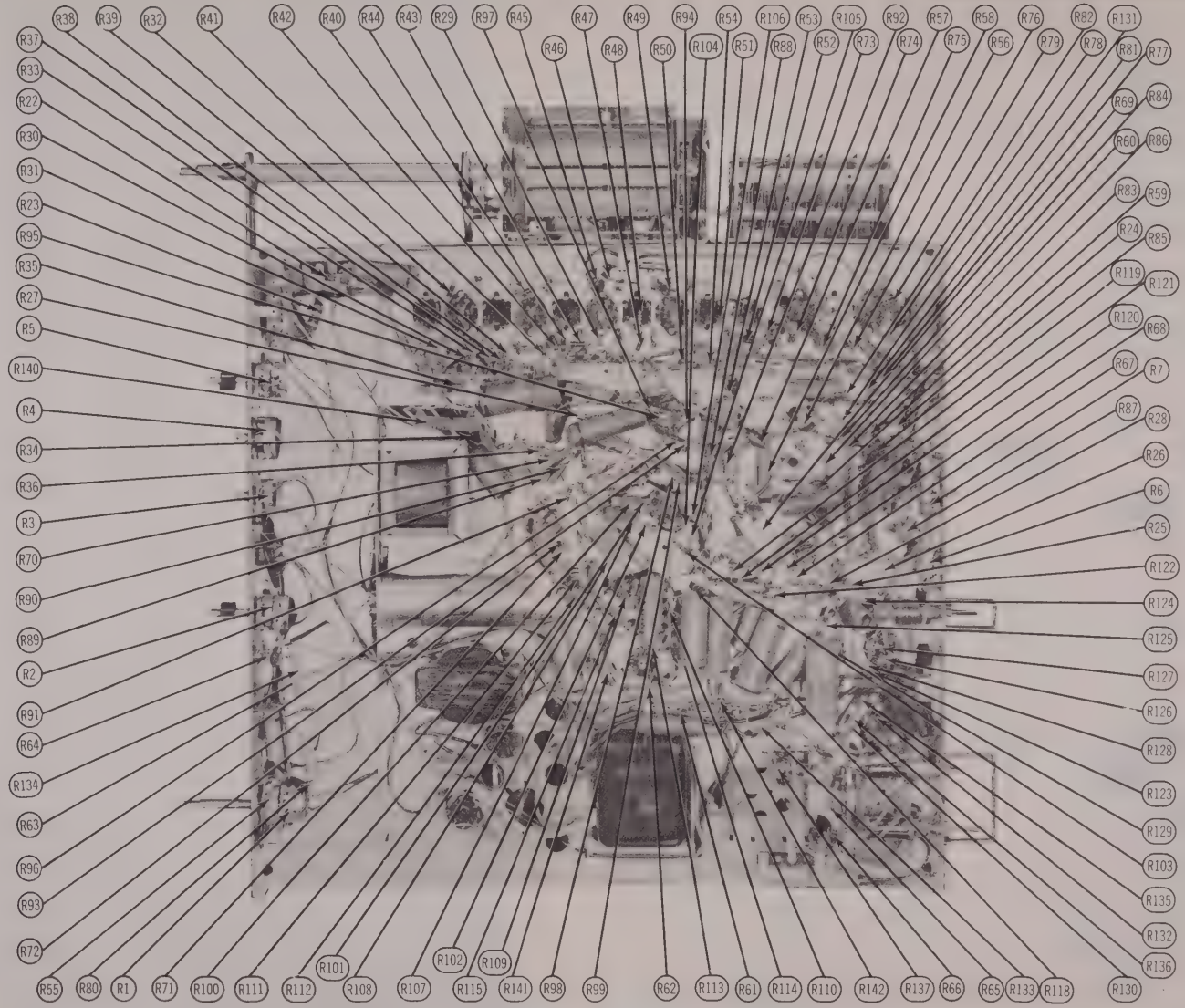
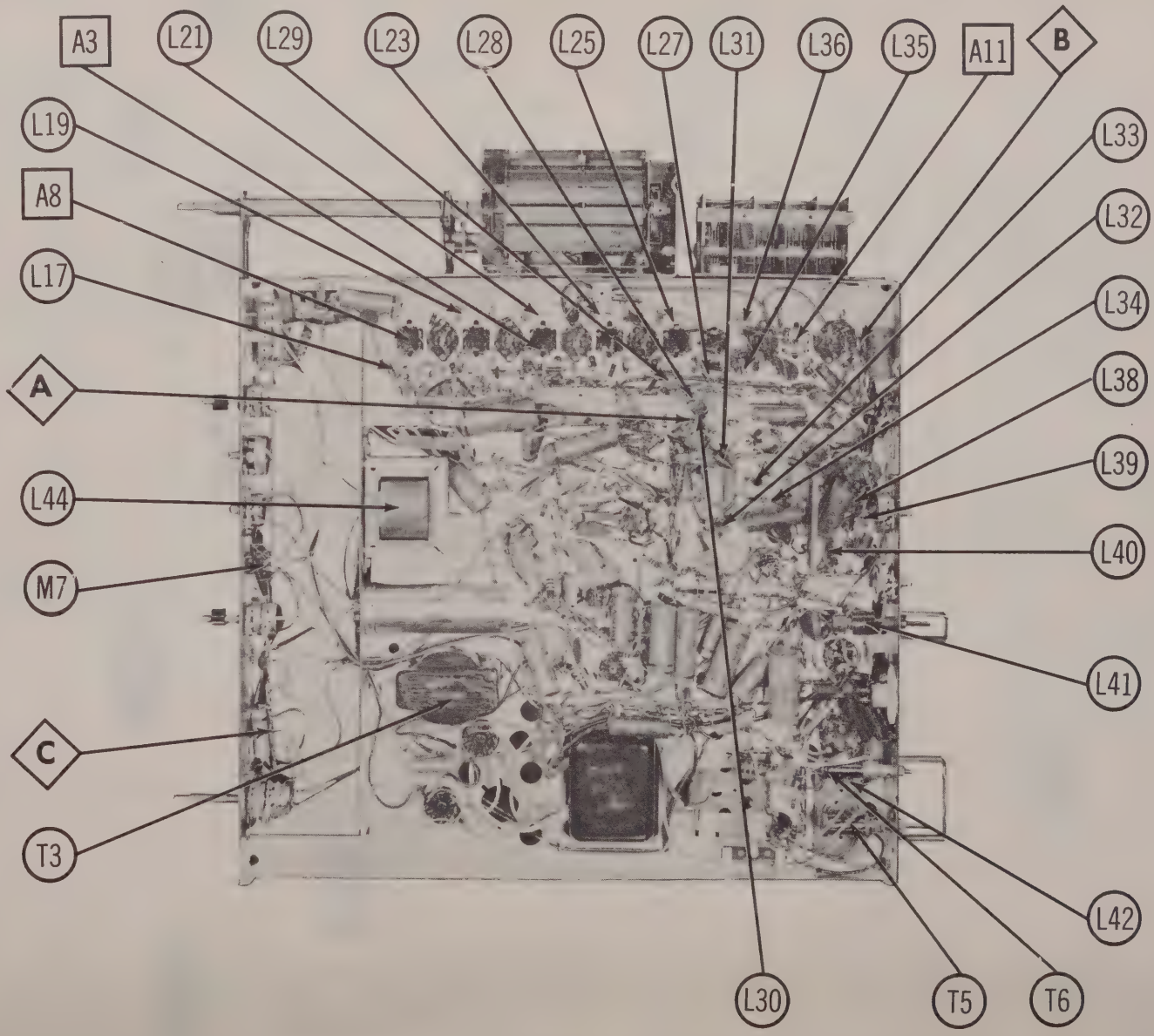



FIG. 6



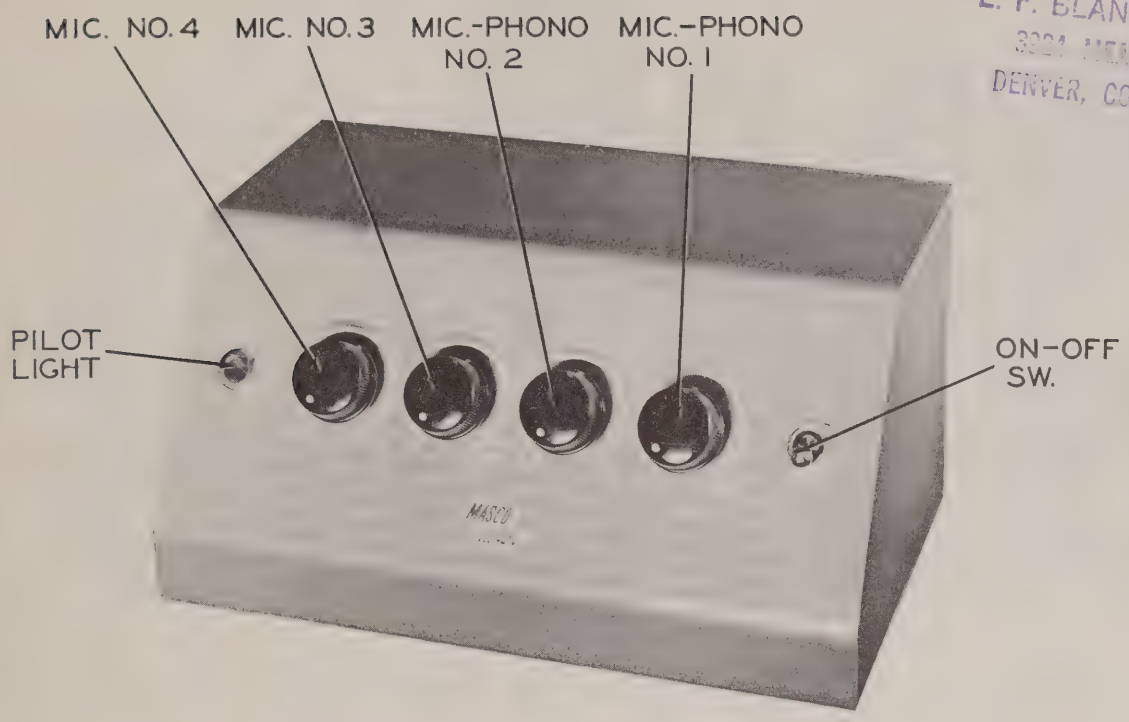

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION




CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3324 MEADE ST.
DENVER, COLORADO

MASCO
MODEL EMM-6




| | |
|---|---|
| TRADE NAME | Masco Model EMM-6 |
| MANUFACTURER | Mark-Simpson Mfg. Co., Inc., 32-28 49th. St., Long Island City 3, N.Y. |
| TYPE SET | AC Operated 6 Channel Audio Pre-Amplifier |
| TUBES (Three) | Types 12AX7 Mic Channels 1 and 2 Pre-Amp., 12AX7 Mic Channels 3 and 4 Pre-Amp., 12AX7 Audio Amplifier |
| POWER SUPPLY | 110-120 Volts AC RATING .10 Amp. @ 117 Volts AC |

MASCO
MODEL EMM-6



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# PARTS LIST AND DESCRIPTIONS



## TUBES (SYLVANIA, GENERAL ELECTRIC or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA | | RTMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| | | MASCO PART No. | STANDARD REPLACEMENT | | |
| V1 | Mic Pre-Amp. | 12AX7 | 12AX7 | 9A | |
| V2 | Mic Pre-Amp. | 12AX7 | 12AX7 | 9A | |
| V3 | AF Amplifier | 12AX7 | 12AX7 | 9A | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | MASCO PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C1A | ▬30 | 150 | | PRS150/30-30-15 | | | | FP21l TC44 | TVL-3435 | Note 1 |
| B | ■30 | 150 | | | | | | | | |
| C | ▲15 | 150 | | | | | | | | |
| C2 | 10 | 50 | | PRS50/10 | | BR105 | | TC32 | TVA-1304 | |
| C3 | .01 | 600 | | P688-01 | D6-103 | PTE6S1 | 811-01 | PT6ll | 6TM-S1 | |
| C4 | .01 | 600 | | P688-01 | D6-103 | PTE6S1 | 811-01 | PT6ll | 6TM-S1 | |
| C5 | .01 | 600 | | P688-01 | D6-103 | PTE6S1 | 811-01 | PT6ll | 6TM-S1 | |
| C6 | .01 | 600 | | P688-01 | D6-103 | PTE6S1 | 811-01 | PT6ll | 6TM-S1 | |
| C7 | .01 | 600 | | P688-01 | D6-103 | PTE6S1 | 811-01 | PT6ll | 6TM-S1 | |
| C8 | .1 | 200 | | P488-1 | DF-104 | PTE4P1 | | PT401 | 4TM-P1 | |

Note 1. Some Models use a 80-20MFD in this application.

## CONTROLS

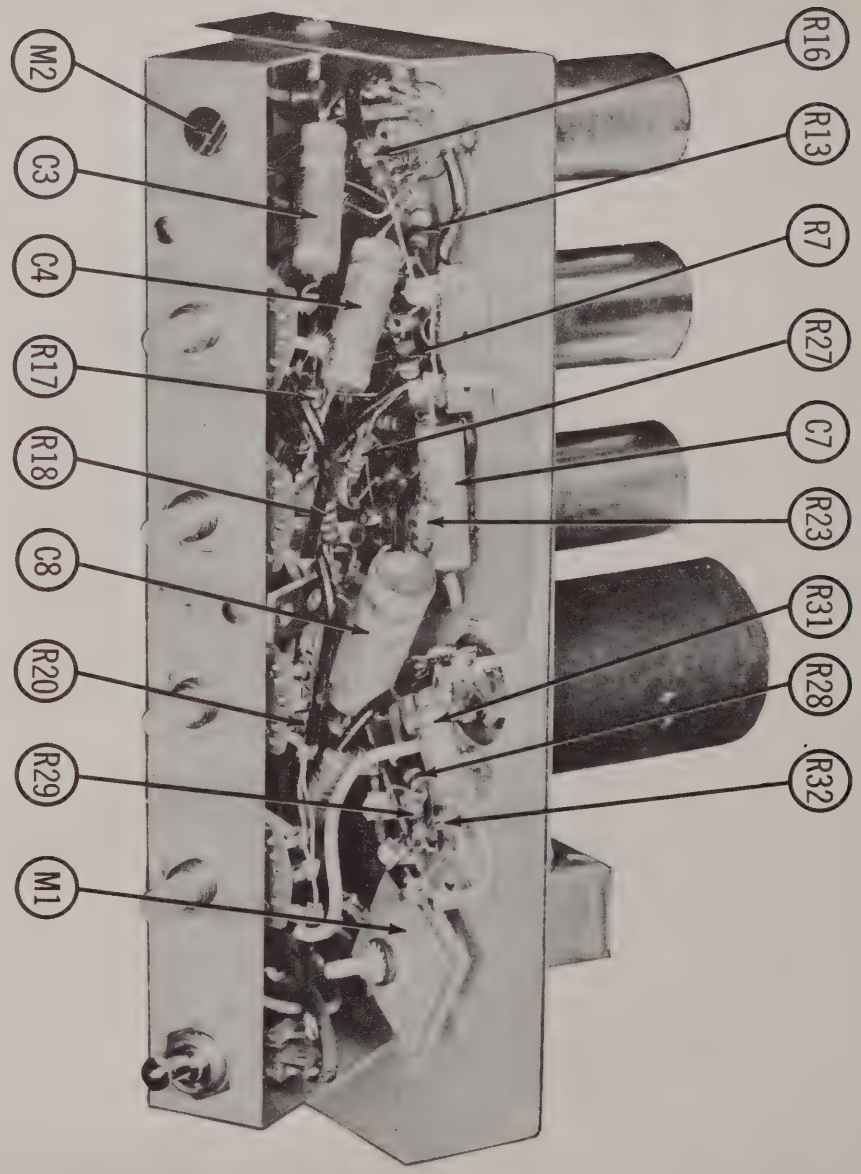
| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | MASCO PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | MALLORY PART No. | |
| R1A | 500KΩ | ½ | BA011-743 | Q13-133 | AG-60-Z | B-60 | U-48 | Mike Volume |
| B | Shaft | | Not Req. | Not Req. | RS-2 | Not Req. | Not Req. | Attach to R1A |
| R2A | 500KΩ | ½ | BA011-743 | Q13-133 | AG-60-Z | B-60 | U-48 | Mike Volume |
| B | Shaft | | Not Req. | Not Req. | RS-2 | Not Req. | Not Req. | Attach to R2A |
| R3A | 500KΩ | ½ | BA011-743 | Q13-133 | AG-60-Z | B-60 | U-48 | Phono Volume |
| B | Shaft | | Not Req. | Not Req. | RS-2 | Not Req. | Not Req. | Attach to R3A |
| R4A | 500KΩ | ½ | BA011-743 | Q13-133 | AG-60-Z | B-60 | U-48 | Phono Volume |
| B | Shaft | | Not Req. | Not Req. | RS-2 | Not Req. | Not Req. | Attach to R4A |

## RESISTORS

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | MASCO PART No. | IRC PART No. | |
| R5 | 470KΩ | ½ | | BTS-470K | |
| R6 | 3300Ω | ½ | | BTS-3300 | |
| R7 | 100KΩ | ½ | | BTS-100K | |
| R8 | 470KΩ | ½ | | BTS-470K | |
| R9 | 3300Ω | ½ | | BTS-3300 | |
| R10 | 100KΩ | ½ | | BTS-100K | |
| R11 | 470KΩ | ½ | | BTS-470K | |
| R12 | 3300Ω | ½ | | BTS-3300 | |
| R13 | 100KΩ | ½ | | BTS-100K | |
| R14 | 470KΩ | ½ | | BTS-470K | |
| R15 | 3300Ω | ½ | | BTS-3300 | |
| R16 | 100KΩ | ½ | | BTS-100K | |
| R17 | 470KΩ | ½ | | BTS-470K | |
| R18 | 470KΩ | ½ | | BTS-470K | |
| R19 | 470KΩ | ½ | | BTS-470K | |

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | MASCO PART No. | IRC PART No. | |
| R20 | 470KΩ | ½ | | BTS-470K | |
| R21 | 2200Ω | ½ | | BTS-2200 | |
| R22 | 4700Ω | ½ | | BTS-4700 | |
| R23 | 270KΩ | ½ | | BTS-270K | |
| R24 | 1Meg | ½ | | BTS-1Meg | |
| R25 | 6800Ω | ½ | | BTS-6800 | |
| R26 | 3300Ω | ½ | | BTS-3300 | |
| R27 | 47KΩ | ½ | | BTS-47K | |
| R28 | 47Ω | ½ | | BTS-47 | |
| R29 | 47Ω | ½ | | BTS-47 | |
| R30 | 2700Ω | 1 | | | |
| R31 | 4700Ω | 1 | | BTA-4700 | |
| R32 | 100KΩ | ½ | | BTS-100K | |
| R33 | 100KΩ | ½ | | BTS-100K | |

# CHASSIS—BOTTOM VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## TRANSFORMER (POWER)

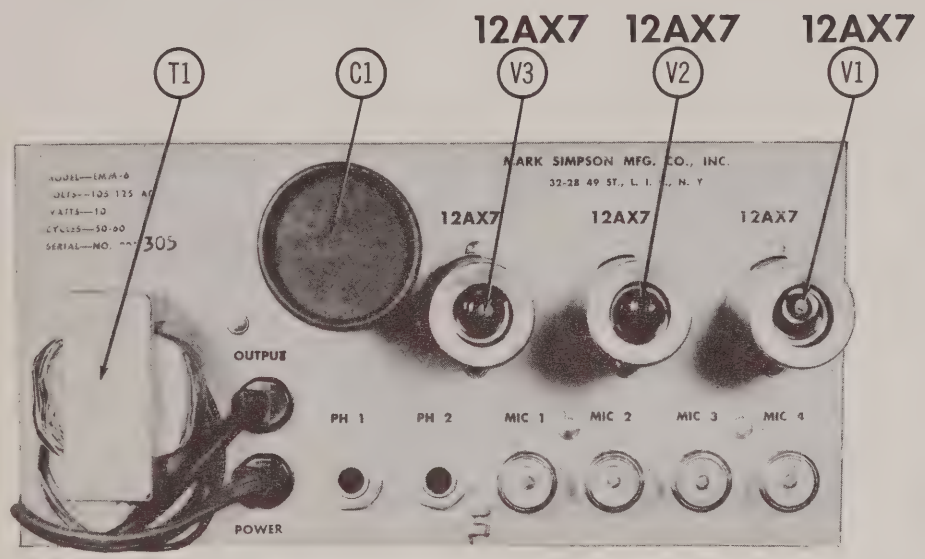
| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | SEC. 3 | MASCO PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. |
| T1 | 117VAC @ .1A | 130V @.005 ADC tap @6.3VAC @.48A | | | | | | | |

## SELENIUM RECTIFIER

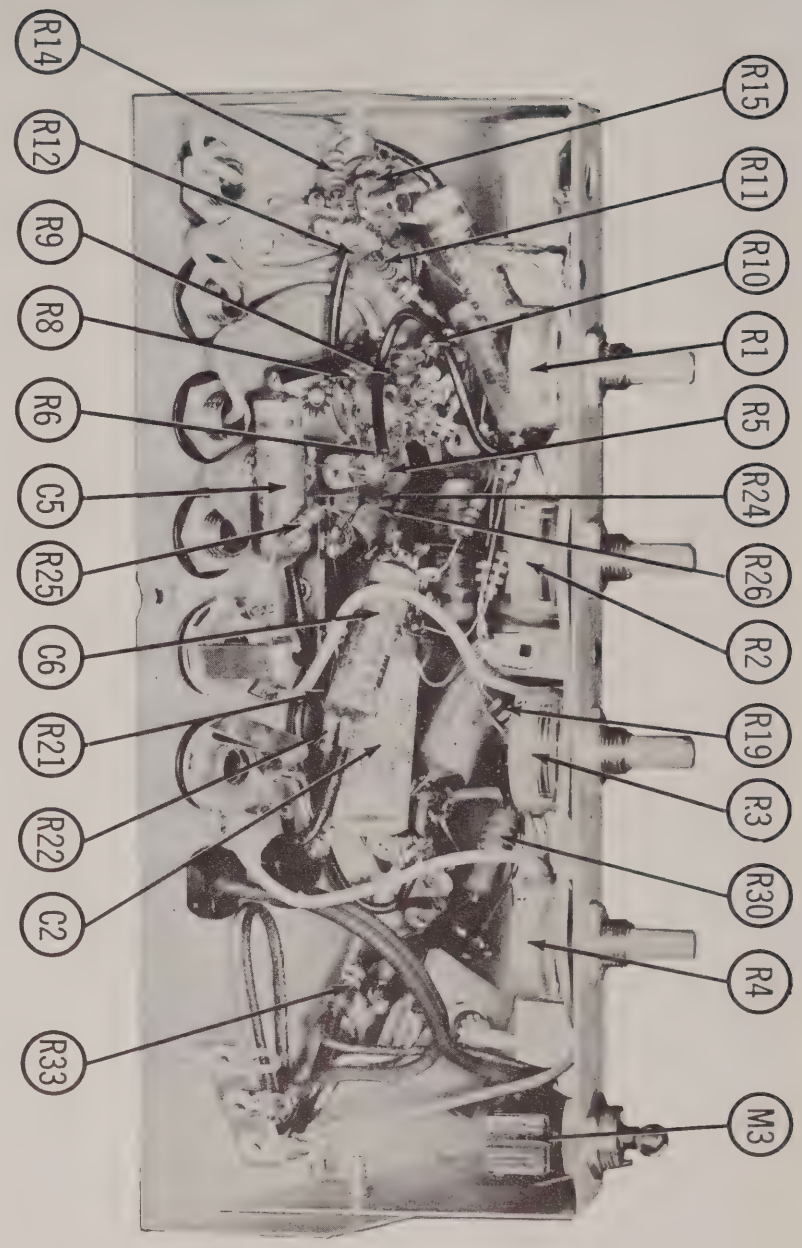
| ITEM No. | RATING | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|
| | CURRENT | MASCO PART No. | SYLVANIA PART No. | SELETRON PART No. | FEDERAL PART No. | MALLORY PART No. | SARKES TARZIAN PART No. |
| M1 | .005ADC | | NA5 | 8J1 | 1002A | 6S65 | 65 |

## MISCELLANEOUS

| ITEM No. | PART NAME | MASCO PART No. | NOTES |
|---|---|---|---|
| M2 | Neon Light | | Type NE-2 |
| M3 | Switch | | Off/On (SPST Toggle) |



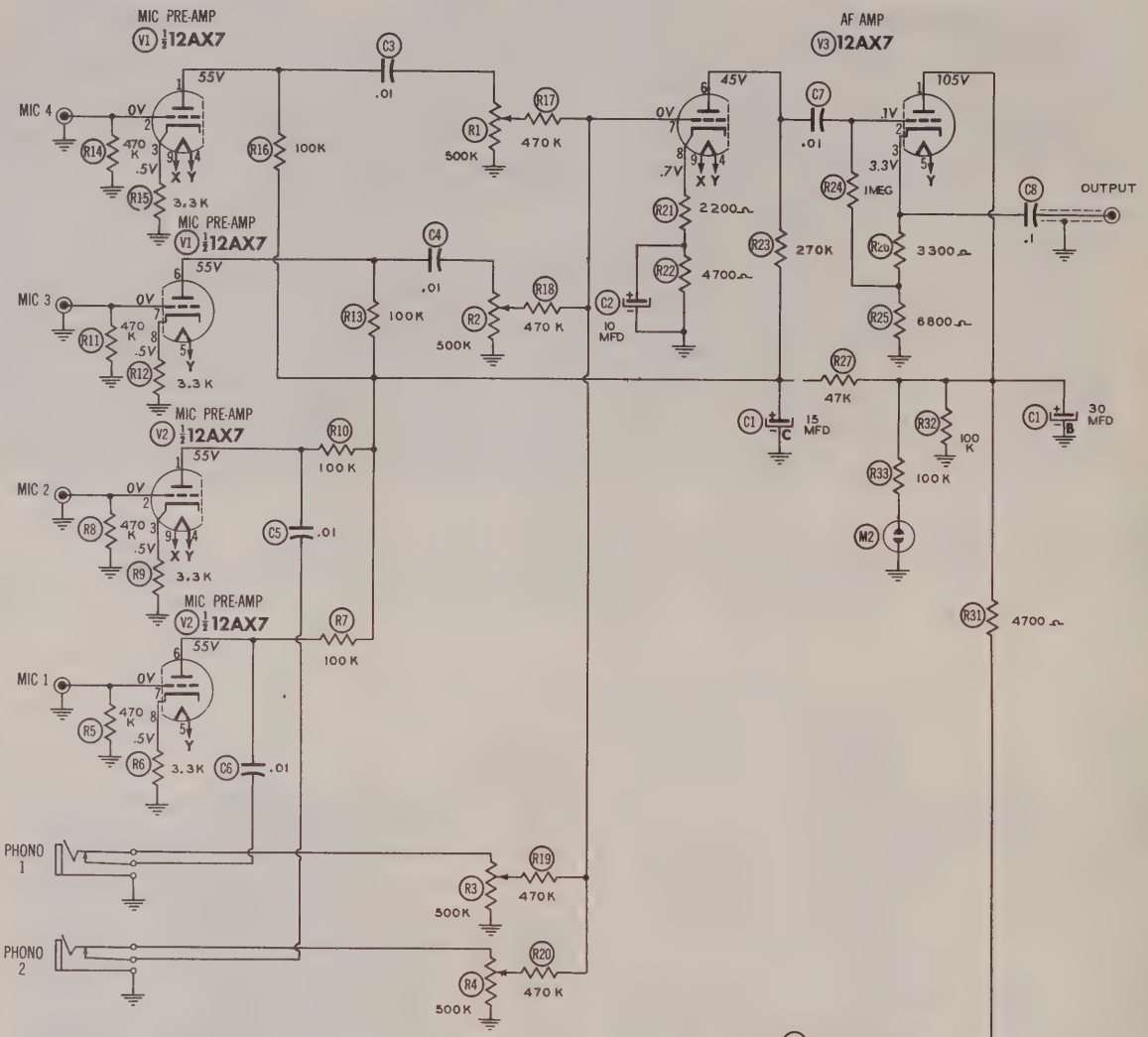

## CHASSIS—BOTTOM VIEW








MASCO MODEL EMM-6

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RESISTANCE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 12AX7 | †155KΩ | 470KΩ | 3.3KΩ | 23Ω | 23Ω | †155KΩ | 470KΩ | 3.3KΩ | 23Ω |
| V 2 | 12AX7 | †155KΩ | 470KΩ | 3.3KΩ | 23Ω | 23Ω | †155KΩ | 470KΩ | 3.3KΩ | 23Ω |
| V 3 | 12AX7 | †7.4KΩ | 1Meg | 10.1KΩ | 23Ω | 23Ω | †325KΩ | 115KΩ | 6.9KΩ | 23Ω |

† MEASURED FROM OUTPUT OF M1.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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MODEL A-17C

MIRRORTONE MODELS A-17C, T, A-21C, CB, T, TB, X, Z (Ch. 9040)

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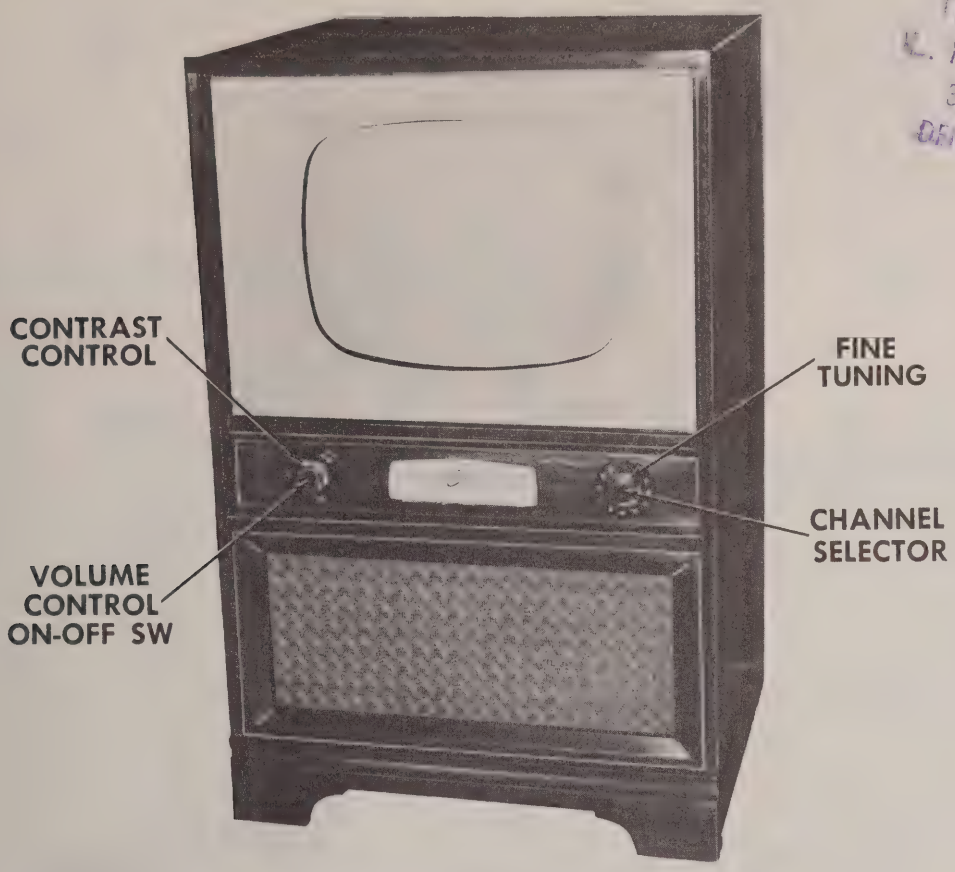


MIRRORTONE MODEL A-17C

| | |
|---|---|
| TRADE NAME | Mirrortone Models A-17C, A-17T, A-21C, A-21CB, A-21T, A-12TB, A-21X, A-21Z (Ch. 9040) |
| MANUFACTURER | John Meck Industries, Plymouth, Indiana |
| TYPE SET | Television Receiver |
| TUBES | Twenty |
| POWER SUPPLY | 110-120 Volts AC-60 Cycle RATING 1.6 Amp. @ 117 Volts AC |
| TUNING RANGE | Channels 2 thru 13, Video IF 26.1MC, Sound IF 21.6MC (Intercarrier) |

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MIRRORTONE MODELS A-17C, T, A-21C, CB, T, TB, X, Z (Ch. 9040)

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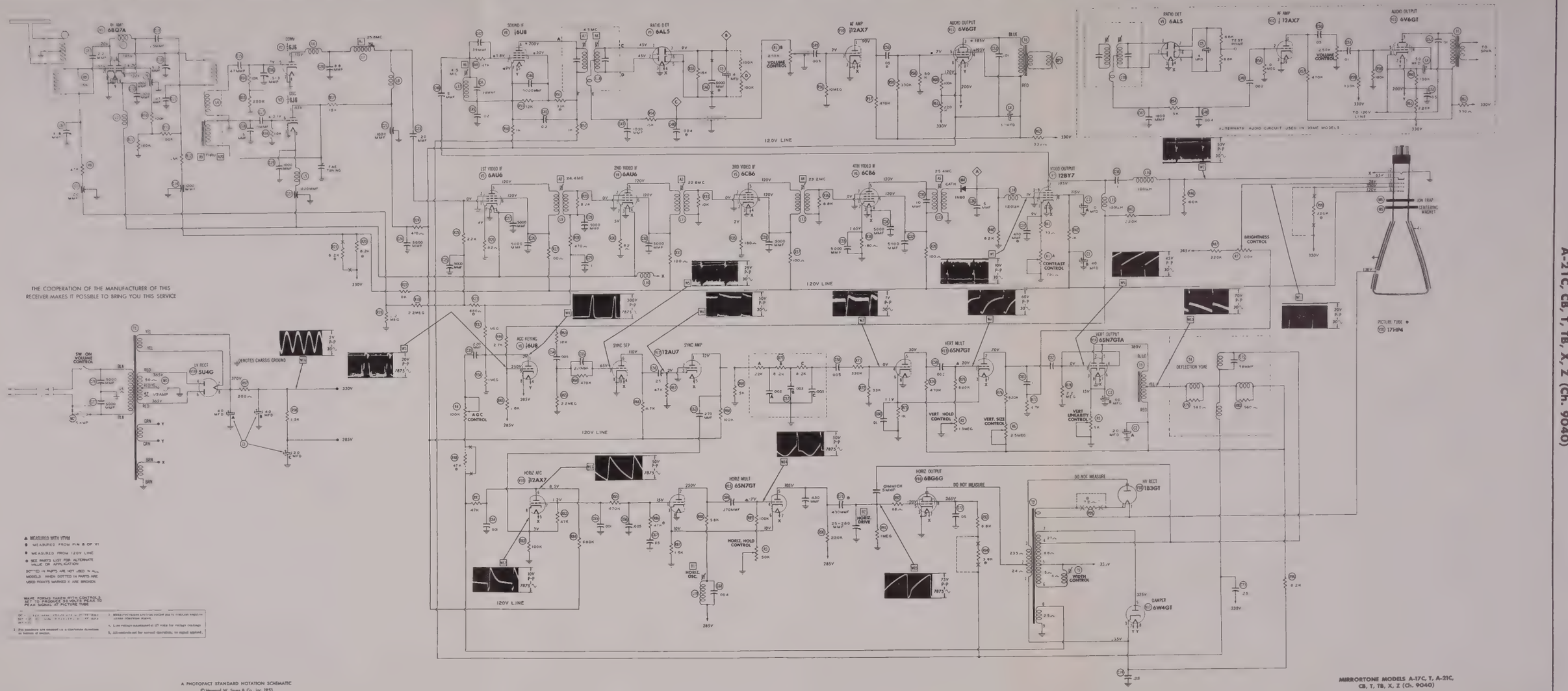
DATE 9-53 SET 216 FOLDER 4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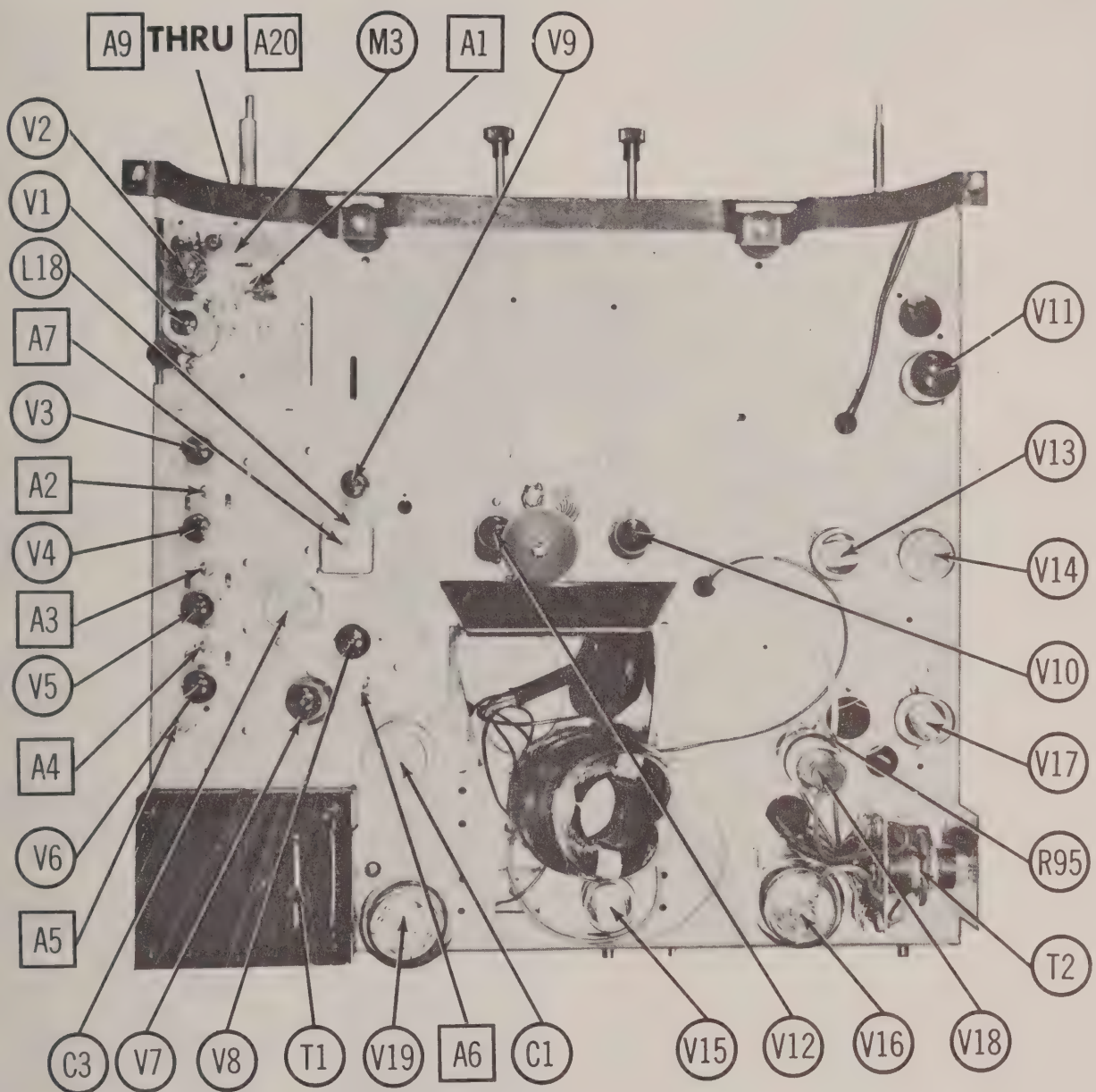
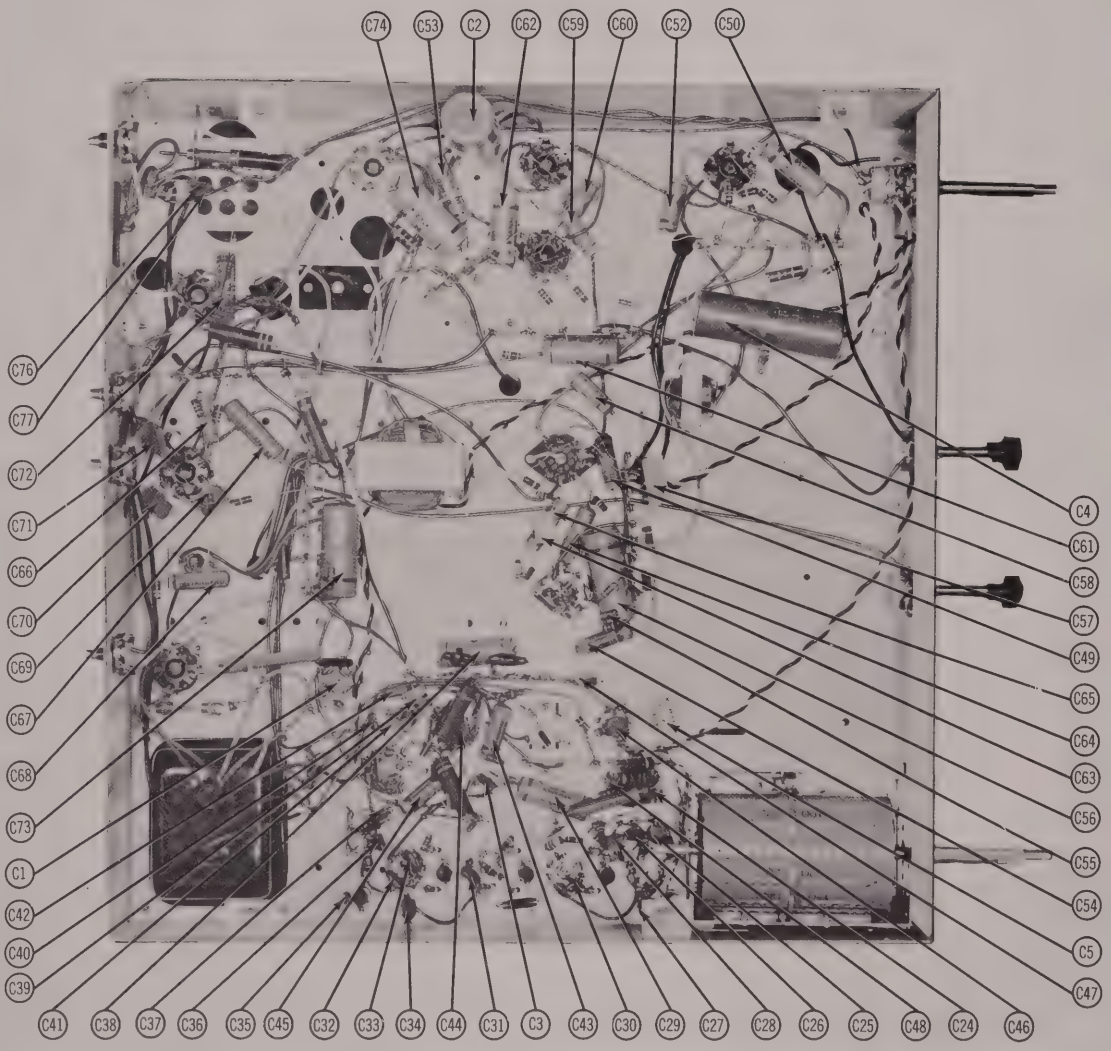
MIRRORTONE MODELS A-17C, T, A-21C, CB, T, TB, X, Z (Ch. 9040)
PAGE 2



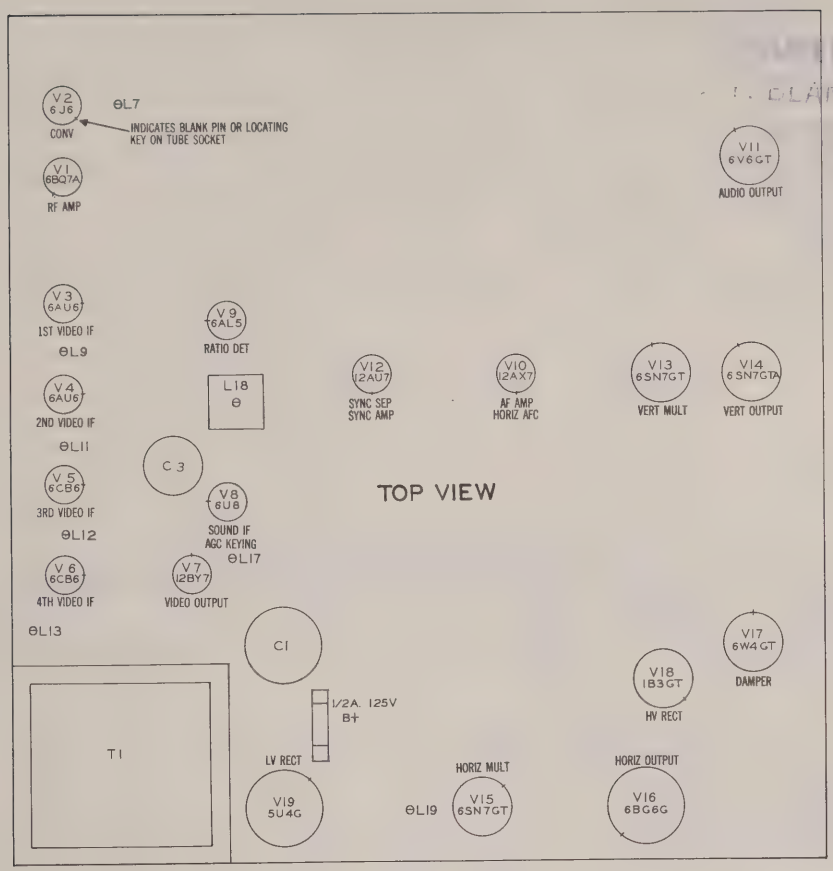

CHASSIS TOP VIEW




CHASSIS BOTTOM VIEW–CAPACITOR IDENTIFICATION

MIRRORTONE MODELS A-17C, T, A-21C, CB, T, TB, X, Z (Ch. 9040)

# TUBE PLACEMENT CHART




# TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V19, Fuse (M)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6, V7, V11**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V7, V20**
Has pic, no sound - **V8, V9, V10, V11**
Overloaded picture - **V8**

SYNC FAILURE
No vert. sync - **V12, V13, V14**
No horiz. sync - **V10, V12, V15**
No vert. or horiz. sync - **V12**

SWEEP FAILURE
No raster, has sound - **V15, V16, V17, V18, V20**
No vertical deflection - **V13, V14**
Poor vert. linearity or foldover - **V13, V14**
Poor horiz. linearity or foldover - **V15, V16, V17**
Narrow picture - **V15, V16, V17, V18, V19**
Vert. off freq. - **V12, V13, V14**
Horiz. off freq. - **V10, V12, V15**

# ALIGNMENT INSTRUCTIONS

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**

The high voltage lead should be securely taped and kept away from the chassis. Do not remove horizontal multivibrator tube to disable the high voltage.
Individual receivers may employ one of two variations in the Video IF strip.
The first may be identified by the values of the grid load resistors on the last two IF amplifier tubes (R33 and R36), both being 6800Ω.
Alignment frequencies for this variation will be indicated in the tables by an asterisk (*).
In the other variation R33 is 10,000 ohms while R36 remains 6800 ohms. Also, in this variation, a 470Ω resistor, R28 decoupled to ground by a .001MFD capacitor is in series with the grid return to the AGC line. Alignment frequencies for this second variation will appear in the tables unmarked.

## VIDEO IF ALIGNMENT

Remove the converter tube, V2, from its socket and replace with a 6J6 which has pin 1 removed.
This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to the ungrounded side of C29 and the positive side to chassis.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | Direct | High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis. | 25.8MC<br>*25.9MC | Any | DC probe to point (A)<br>Common to chassis. | A1 | Adjust for maximum deflection. Adjust generator output to maintain 1 Volt at VTVM. |
| 2. | " | " | 24.4MC<br>*24.3MC | " | " | A2 | " |
| 3. | " | " | 22.8MC<br>*23.1MC | " | " | A3 | " |
| 4. | " | " | 23.2MC<br>*22.9MC | " | " | A4 | " |
| 5. | " | " | 25.4MC<br>*25.7MC | " | " | A5 | " |

## OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 6. | Direct | High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis. | 24MC<br>(10MC Swp) | 21.6MC<br>22.7MC<br>26.1MC | Any | Vert. amp to point (A) Low side to chassis. | | Check for response similar to Fig.1. If necessary retouch A1 thru A5 for desired response. |

## SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 7. | .01MFD | High side to point (A)<br>Low side to chassis. | 4.5MC<br>(Unmod) | Any | DC probe to point (B)<br>Common to chassis. | A6, A7 | Adjust for maximum meter deflection. Attenuate generator output to maintain less than 5 Volts at VTVM. |
| 8. | " | " | " | " | DC probe to point (C)<br>Common to point (D) | A8 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

## SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 7. | .01MFD | High side to point (A)<br>Low side to chassis. | 4.5MC<br>(450KC Swp) | 4.5MC | Any | Vert. amp to point (B) Low side to chassis. | A6, A7 | Disconnect stabilizer capacitor C5. Adjust for curve of maximum amplitude and symmetry as in Fig.2. |
| 8. | " | " | " | " | " | Vert. amp to point (C) Low side to chassis. | A8 | Reconnect capacitor C5. Adjust so that 4.5MC occurs at center of crossover lines as in Fig.3. Slightly retouch A7 for maximum amplitude and straightness of crossover lines. |

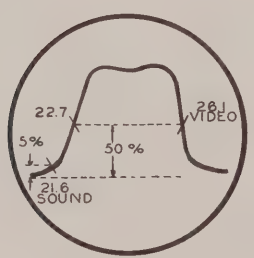


FIG. 1

FIG. 2

# ALIGNMENT INSTRUCTIONS (CONT.)

## OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket. Connect bias battery as under Video IF Alignment.
The channel oscillator adjustment screws are reached thru a hole just to the right of the channel switch sha ft. The correct adjustment screw is accessible through this hole as the channel switch is turned for each channel.
Connect the synchronized sweep voltage from sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 9. | Two 120Ω Carbon Resistors | Across antenna terminals with 120Ω in each lead. | 213MC (10MC Swp) | 211.25MC 215.75MC | 13 | Vert. amp to point (A) Low side to chassis. | A9 | Adjust to place video marker at 50% on high frequency side of video IF response curve as in Fig. 4. |
| | | | 207MC (10MC Swp) | 205.25MC 209.75MC | 12 | | A10 | |
| | | | 201MC (10MC Swp) | 199.25MC 203.75MC | 11 | | A11 | |
| | | | 195MC (10MC Swp) | 193.25MC 197.75MC | 10 | | A12 | |
| | | | 189MC (10MC Swp) | 187.25MC 191.75MC | 9 | | A13 | |
| | | | 183MC (10MC Swp) | 181.25MC 185.75MC | 8 | | A14 | |
| | | | 177MC (10MC Swp) | 175.25MC 179.75MC | 7 | | A15 | |
| | | | 85MC (10MC Swp) | 83.25MC 87.75MC | 6 | | A16 | |
| | | | 79MC (10MC Swp) | 77.25MC 81.75MC | 5 | | A17 | |
| | | | 69MC (10MC Swp) | 67.25MC 71.75MC | 4 | | A18 | |
| | | | 63MC (10MC Swp) | 61.26MC 65.75MC | 3 | | A19 | |
| | | | 57MC (10MC Swp) | 55.25MC 59.75MC | 2 | | A20 | |

## RF AND MIXER ALIGNMENT

The RF and Mixer portion of this receiver has been correctly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

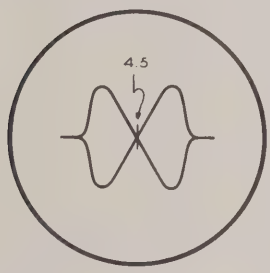



FIG. 3

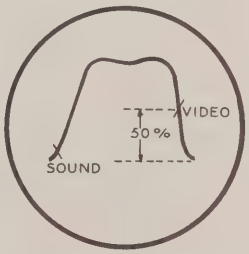
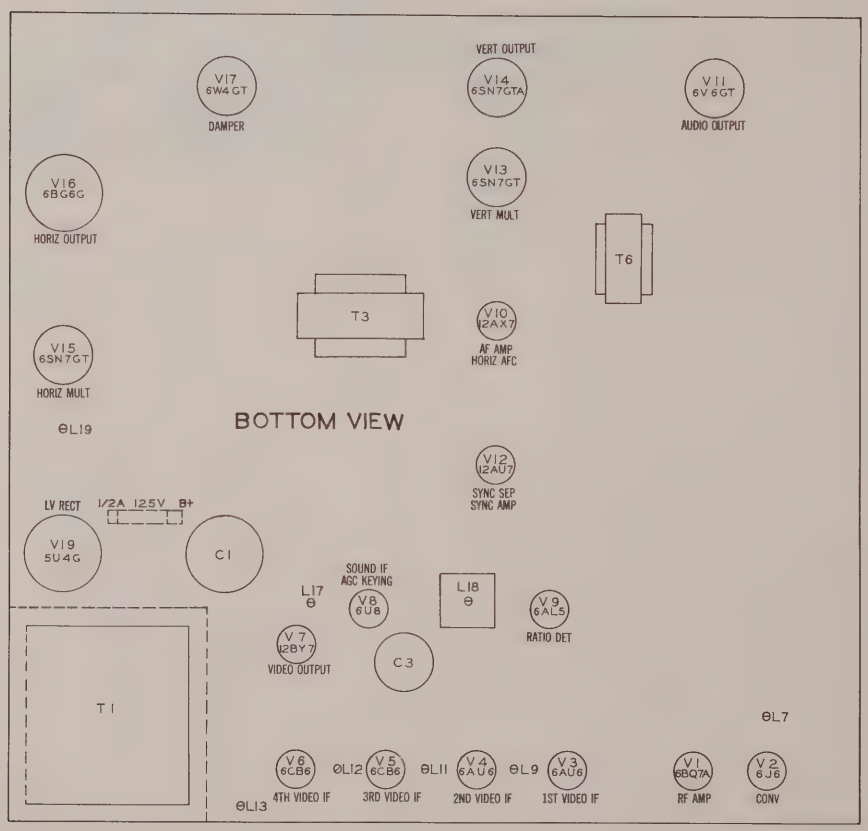



FIG. 4

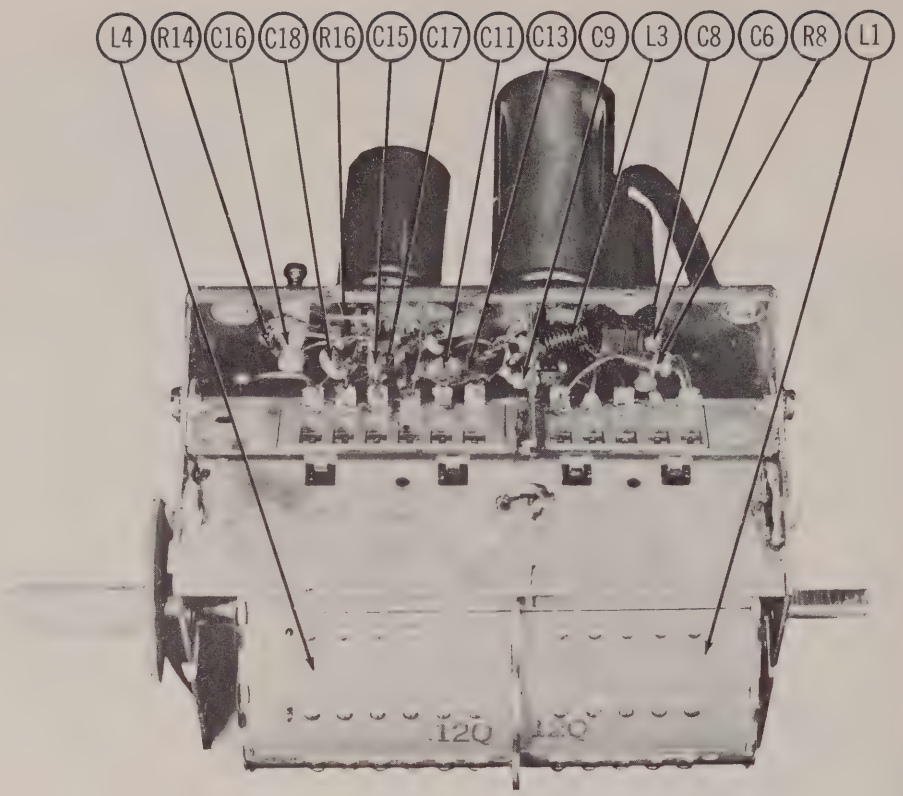
# RESISTANCE MEASUREMENTS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 6BQ7A | INF | 1.4Meg | 0Ω | .1Ω | 0Ω | †5.3KΩ | †175KΩ | INF | 0Ω |
| V 2 | 6J6 | ‡15.5KΩ | ‡470Ω | .1Ω | 0Ω | 230KΩ | 10KΩ | 0Ω | | |
| V 3 | 6AU6 | 1.4Meg | 0Ω | 0Ω | .1Ω | ‡100Ω | ‡100Ω | 82Ω | | |
| V 4 | 6AU6 | 1.4Meg | 0Ω | 0Ω | .1Ω | ‡100Ω | ‡100Ω | 82Ω | | |
| V 5 | 6CB6 | .1Ω | 180Ω | 0Ω | .1Ω | ‡100Ω | ‡100Ω | 0Ω | | |
| V 6 | 6CB6 | .1Ω | 180Ω | 0Ω | .1Ω | ‡100Ω | ‡100Ω | 0Ω | | |
| V 7 | 12BY7 | 200Ω | 8.2KΩ | 0Ω | .1Ω | .1Ω | 0Ω | †6.2KΩ | ‡1KΩ | 0Ω |
| V 8 | 6U8 | 850KΩ | ‡48KΩ | ‡13KΩ | ‡70KΩ | ‡70KΩ | 1KΩ | ‡1KΩ | †1.7KΩ | †3.5KΩ |
| V 9 | 6AL5 | INF | INF | .1Ω | 0Ω | 0Ω | 0Ω | 15KΩ | | |
| V 10 | 12AX7 | †470KΩ | 10Meg | 0Ω | .1Ω | .1Ω | 47KΩ | 150KΩ | 100KΩ | 0Ω |
| V 11 | 6V6GT | INF | ‡70KΩ | †5.5KΩ | †530Ω | †120KΩ | INF | ‡70KΩ | 50KΩ | |
| V 12 | 12AU7 | ‡40KΩ | 0Ω | 47KΩ | .1Ω | .1Ω | ‡4.7KΩ | 2.7Meg | 0Ω | 0Ω |
| V 13 | 6SN7GT | 1.7Meg | ■2.7Meg | 1KΩ | 33KΩ | ■478KΩ | 1KΩ | .1Ω | 0Ω | |
| V 14 | 6SN7GTA | 2.2Meg | ■9.3KΩ | 850Ω | 2.2Meg | ■9.3KΩ | 850Ω | .1Ω | 0Ω | |
| V 15 | 6SN7GT | 620KΩ | †7.3KΩ | 1.5KΩ | 125KΩ | †220KΩ | 1.5KΩ | 0Ω | .1Ω | |
| V 16 | 6BG6G | 2.5Ω | 0Ω | 0Ω | 47KΩ | 1Meg | INF | .1Ω | †11KΩ | Top Cap ■24Ω |
| V 17 | 6W4GT | INF | INF | 3Meg | INF | †210Ω | INF | ‡70KΩ | ‡70KΩ | |
| V 18 | 1B3GT | PINS 1 - 8 HAVE INF RESISTANCE | | | | | | | | Top Cap ■260Ω |
| V 19 | 5U4GT | INF | 50KΩ | INF | 50Ω | INF | 47Ω | INF | 50KΩ | |
| V 20 | 17HP4 | 0Ω | 30KΩ | Pin 6 ‡ 0Ω | Pin 10 †220KΩ | Pin 11 †80KΩ | Pin 12 .1Ω | | | |

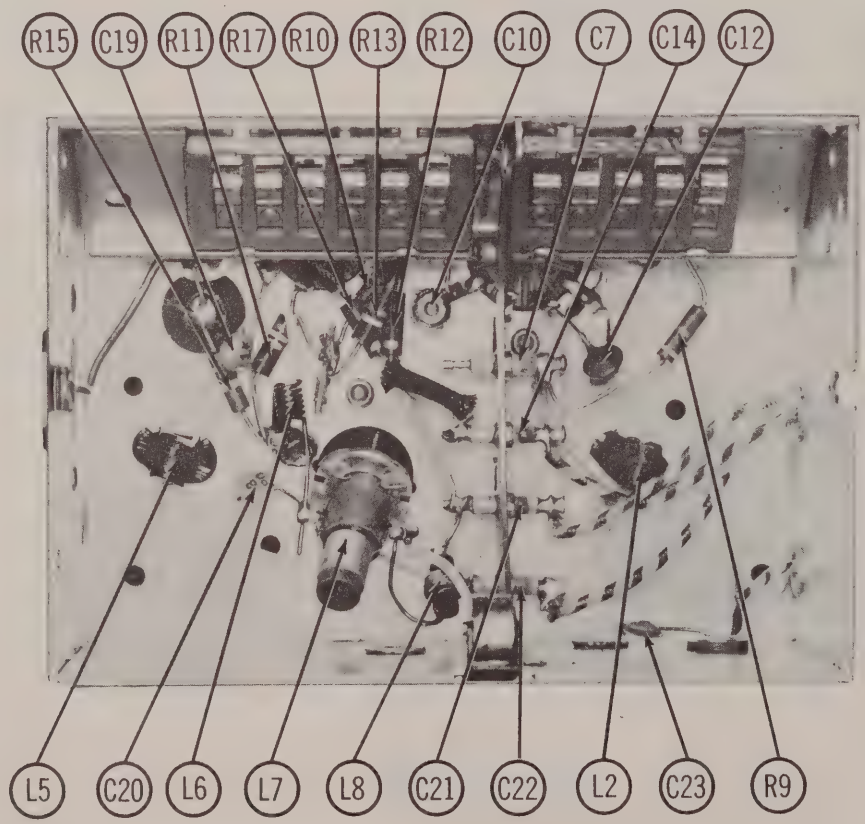
† MEASURED FROM PIN 2 OF V19.
‡ MEASURED FROM 120 VDC LINE.
■ MEASURED FROM PIN 3 OF V17.



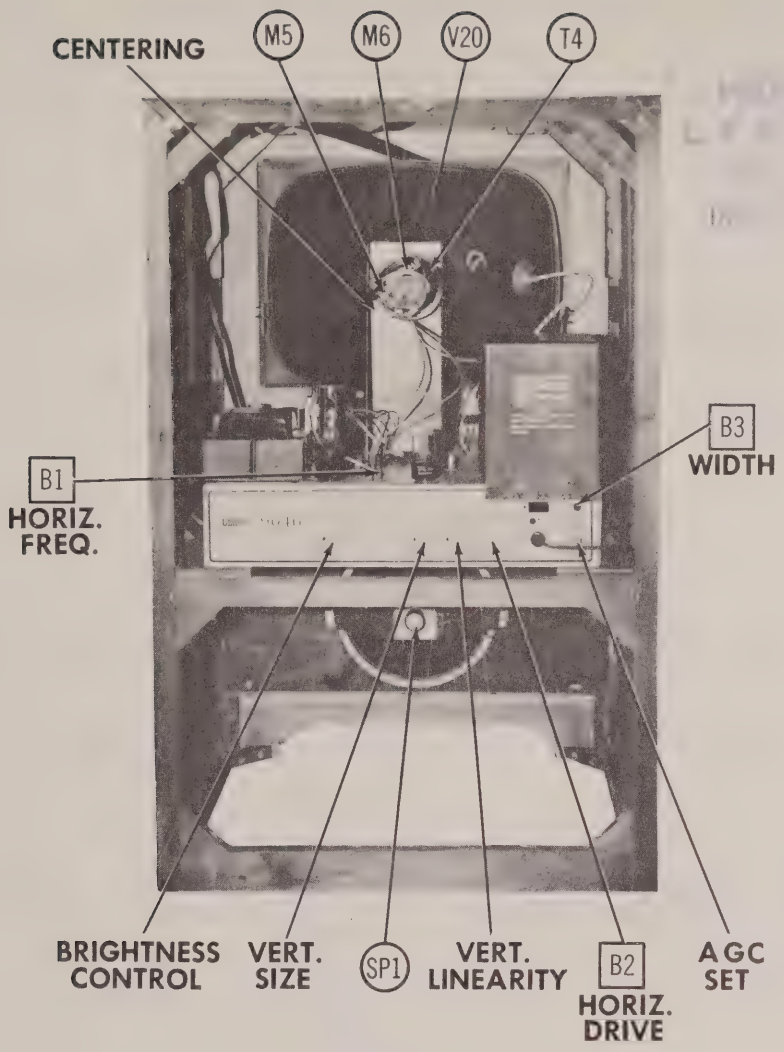

# TUBE PLACEMENT CHART




RF TUNER-RIGHT SIDE




RF TUNER-BOTTOM VIEW




CABINET-REAR VIEW

## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control at mid-position and adjust the horizontal oscillator slug (B1) until the picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B2) counter clockwise as far as possible without the presence of vertical white lines or compression of the center of the picture.

Adjust the width slug (B3) for a picture slightly wider than necessary to fill the picture mask horizontally.

# TROUBLE SHOOTING AIDS

## SWEEP

### HORIZONTAL

**LOSS OF SWEEP**

See "Loss of High Voltage".

Check amplitude of waveform W15.

| If Insufficient | If Sufficient |
|---|---|
| Substitute V15 and check circuit components. Check coupling capacitor between V15 and V16. | Substitute V16 and V17. Check T2, T4A, T5, C72 and other associated components. |

**DRIVE LINES**

Check setting of drive control (B2). Substitute V16 and V17. Check associated components.

**COMPRESSED LEFT SIDE**

Substitute V16 and V17. Check T2 and associated components.

**FOLDS**

Substitute V17. Check T2, T4A and associated components,

**XMAS TREE EFFECT**

Substitute V15 and check C68.

### VERTICAL

**LOSS OF SWEEP**

Check waveform W9.

| If Unsatisfactory | If Satisfactory |
|---|---|
| Substitute V13 and check associated components. | Substitute V14. Check vertical output transformer and other components of the output tube. |

**INSUFFICIENT SWEEP**

Follow procedure outlined under "Loss of Sweep".

**COMPRESSED AT BOTTOM**

Substitute V14 and check C2A and C2B.

**FOLDS**

Substitute V14. Check T3 and T4B. Check coupling capacitor between V13 and V14.

## SYNC

### HORIZONTAL

**LOSS OF SYNC**

Substitute V10 and V15. Check waveform W12;

| If Unsatisfactory | If Satisfactory |
|---|---|
| Check components of sync amplifier and sync clipper. Check coupling network between V12B and V10B. | Check coupling network between V10 and V15A. Check circuit components of horizontal oscillator and discharge tube. |

**CRITICAL HOLD**

Follow procedure outlined under "LOSS OF SYNC".

**PULLING PICTURE (Fig. 1)**

Check C67 and R86 for open.

### VERTICAL

**LOSS OF SYNC**

Substitute V12 and V13. Check waveform W7;

| IF Unsatisfactory | If Satisfactory |
|---|---|
| Check components of sync amplifier and sync clipper. Check integrating network and coupling network between integrater and V13. | Check components of vertical oscillator and waveshaping network. |

**CRITICAL SYNC**

Follow procedure outlined under "LOSS OF SYNC".

**TRIGGERING**

Substitute V13 and dress filament leads away from any grid leads of vertical oscillator.

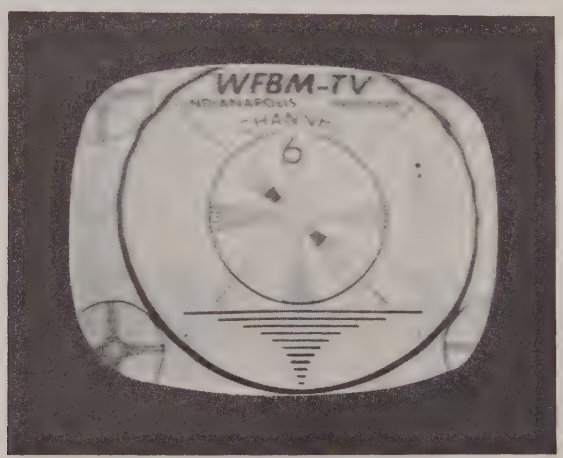
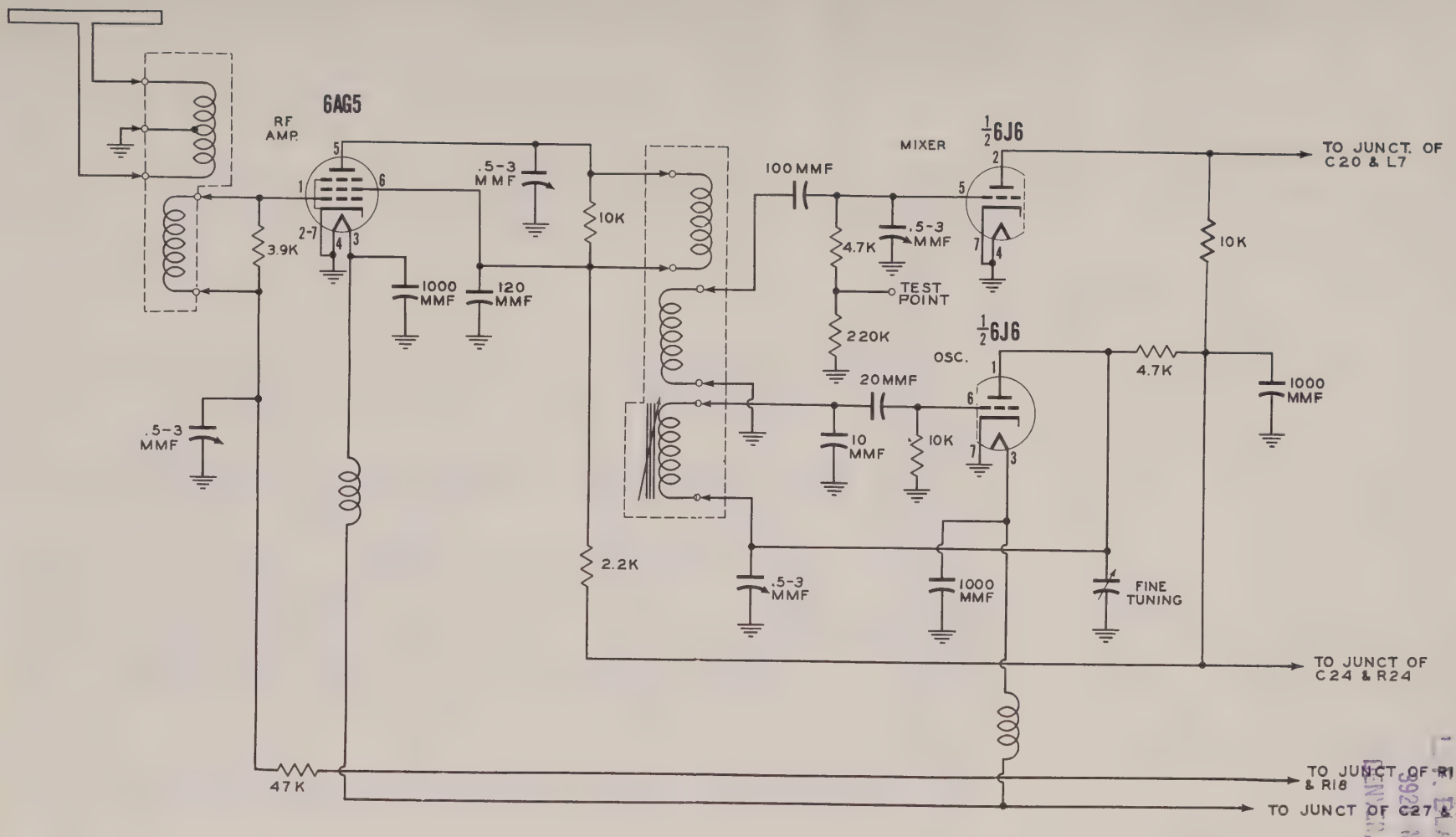



FIG.1 PULLING PICTURE
SEE HORIZ.SYNC.




ALTERNATE TUNER USED IN SOME MODELS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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# ALTERNATE TUNER SCHEMATIC

# PARTS LIST AND DESCRIPTIONS

## TUBES (SYLVANIA, GENERAL ELECTRIC or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA: Mirrortone PART No. | STANDARD REPLACEMENT | RTMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| V1 | RF Amplifier | 6BQ7A | 6BQ7A | 9AJ | |
| V2 | Converter | 6J8 | 6J8 | 7BF | |
| V3 | 1st. Video IF Amp. | 6AU6 | 6AU6 | 7BK | |
| V4 | 2nd. Video IF Amp. | 6AU6 | 6AU6 | 7BK | |
| V5 | 3rd. Video IF Amp. | 6CB6 | 6CB6 | 7CM | |
| V6 | 4th. Video IF Amp. | 6CB6 | 6CB6 | 7CM | |
| V7 | Video Output | 12BY7 | 12BY7 | 9BF | |
| V8 | Sound IF Amp.- AGC Keying | 6U8 | 6U8 | 9AE | |
| V9 | Ratio Detector | 6AL5 | 6AL5 | 6BT | |
| V10 | AF Amplifier- Horiz. AFC | 12AX7 | 12AX7 | 9A | |
| V11 | Audio Output | 6V6GT | 6V6GT | 7S | |
| V12 | Sync Separator Sync Amplifier | 12AU7 | 12AU7 | 9A | |
| V13 | Vert. Mult. | 6SN7GT | 6SN7GT | 8BD | |
| V14 | Vert. Output | 6SN7GTA | 6SN7GTA | 8BD | |
| V15 | Horiz. Mult. | 6SN7GT | 6SN7GT | 8BD | |
| V16 | Horiz. Output | 6BG6G | 6BG6G | 5BT | |
| V17 | Damper | 6W4GT | 6W4GT | 4CG | |
| V18 | HV Rectifier | 1B3GT | 1B3GT | 3C | |
| V19 | L.V Rectifier | 5U4G | 5U4G | 5T | |

## CATHODE-RAY TUBE

| ITEM No. | REPLACEMENT DATA: Mirrortone PART No. | SYLVANIA PART No. | GENERAL ELECTRIC PART No. | RTMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| V20A | 17HP4 | 17HP4 | | 12C | |
| B | 21FP4 | 21FP4 | | 12C | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING: CAP. | VOLT | Mirrortone PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C1A | ±40 | 450 | C1C-10075 | AFH4-79 | | B045 | | FP447 | TVL-3786 | |
| B | ±40 | 450 | | | | BR3045A | | | | |
| C | ±20 | 450 | | | | | | | | |
| C2A | 30 | 450 | C1C-10050 | PRS450/20 | | BR2045A | | TC25 | TVL-2713 | Red |
| B | 100 | 25 | | PRS25/100 | | BR1251A | | TC2501 | | Yellow |
| C3A | ±10 | 250 | C1C-10074 | AFH3-28 | | C022 | | FP330.7 | TVL-2617 | |
| B | ±40 | 350 | | | | | | | | |
| C4 | 50 | 350 | C1A-10087C | PRS450/50 | | BR5035 | | TC58 | TVA-1713 | |
| C5 | 4 | 50 | C1A-10027A | PRS150/4 | | BR550 | | TC30 | TVA-1303 | |
| C6 | 3-8 | | | | 829-10 | | | | | |
| C7 | 1000 | | | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C8 | 2.2 | | | S12.2NP0 | TCZ-2.2 | | NP0K-2R2 | | 5TCCB-V22 | |
| C9 | 1000 | | | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C10 | .5-3 | | | | 829-3 | | | CT55A | | |
| C11 | 47 | | | BPD-000047 | D5-470 | | GP1K-470 | UC-5447 | 5GA-Q47 | |
| C12 | 1000 | | | BPD-001 | DD-102 | TM5D1 | 801-001 | DC-521 | 5HK-D1 | |
| C13 | 1.5 | | | S1.5NP0 | TCZ-1.5 | | NP0K-1R5 | ZT-5515 | 5TCCB-V15 | |
| C14 | 1000 | | | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C15 | 47 | | | BPD-000047 | D5-470 | | GP1K-470 | UC-5447 | 5GA-Q47 | |
| C16 | .5-3 | | | | 829-3 | | | CT55A | | |
| C17 | 10 | | | S10N750 | TCN-10 | | N750K-100 | NT-541 | 5TCU-Q1 | |
| C18 | 5 | | | S15NP0 | TCZ-4.7 | | NP0K-050 | ZT-555 | 5TCCB-V47 | |
| C19 | 1000 | | | BPD-001 | DD-102 | TM5D1 | 801-001 | DC-521 | 5HK-D1 | |
| C20 | 6.8 | | | S15.8NP0 | TCZ-5.8 | | NP0K-6R8 | ZT-5568 | 5TCCB-V68 | |
| C21 | 1000 | | | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C22 | 1000 | | | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C23 | 120 | | | BPD-00013 | D5-121 | TM5T12 | GP2K-121 | UC-5312 | 5GA-T12 | |
| C24 | 5000 | | CMX-10002 | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |
| C25 | 5000 | | CMX-10002 | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |
| C26 | 5000 | | CMX-10002 | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |
| C27 | 5000 | | CMX-10002 | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |
| C28 | 5000 | | CMX-10002 | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |
| C29 | .1 | 600 | | P688-1 | DF-104 | PTE6P1 | | PT601 | 6TM-P1 | |
| C30 | 5000 | | CMX-10002 | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |
| C31 | 5000 | | CMX-10002 | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |
| C32 | 5000 | | CMX-10002 | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |
| C33 | 5000 | | CMX-10002 | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |
| C34 | 5000 | | CMX-10002 | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |
| C35 | 10 | | | S10N750 | TCN-10 | | N750K-100 | NT-541 | 5TCU-Q1 | |
| C36 | 5 | | | S15 | TCZ-4.7 | 5W5V5 | GP1K-050 | ZT-555 | 5GA-V5 | |
| C37 | 470 | | | R1470 | D6-471 | | GP2K-471 | UC-5347 | 5GA-T47 | Note 1 |
| C38 | .1 | 600 | | P688-1 | DF-104 | PTE6P1 | | PT601 | 6TM-P1 | |
| C39 | 220 | 500 | | | | | | | | |
| C40 | 5 | | | S15 | TCZ-4.7 | 5W5V5 | GP1K-050 | ZT-555 | 5GA-V5 | |
| C41 | 39 | 500 | | 1468-00004 | | 5W5Q4 | | MC223 | 1FM-44 | |
| C42 | 39 | 500 | | 1468-00004 | | 5W5Q4 | | MC223 | 1FM-44 | |
| C43 | .02 | 600 | | P688-02 | DF-203 | PTE6S2 | | PT612 | 6TM-S2 | |
| C44 | 5000 | | CMX-10002 | BPD-006 | MD-502 | TM5D5 | 811-006 | DC-525 | 5HK-D5 | |
| C45 | .02 | 600 | | P688-02 | DF-203 | PTE6S2 | | PT612 | 6TM-S2 | Note 5 |
| C46 | 5000 | | CMX-10002 | BPD-006 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |
| C47 | 1000 | | | S11000 | D6-102 | TM5D1 | GP2L-102 | UC-521 | 5HK-D1 | |
| C48 | .004 | 400 | | P688-004 | D5-402 | PTE6D4 | GP3-333-402 | PT634 | 6TM-D4 | Note 2 |
| C49 | .005 | 600 | | P688-005 | D5-502 | PTE6D5 | GP3-333-502 | PT625 | 6TM-D5 | |
| C50 | .05 | 600 | | P688-05 | DF-503 | PTE6S5 | | PT615 | 6TM-S5 | Note 3 |
| C51 | .01 | 600 | | P688-01 | D5-103 | PTE6S1 | GP2-333-103 | PT611 | 6TM-S1 | |
| C52 | .01 | 600 | | P688-01 | D5-103 | PTE6S1 | GP2-333-103 | PT611 | 6TM-S1 | |
| C53 | .05 | 600 | | P688-05 | DF-503 | PTE6S5 | | PT615 | 6TM-S5 | |
| C54 | .005 | 600 | | P688-005 | D5-502 | PTE6D5 | GP2-333-502 | PT625 | 6TM-D5 | |
| C55 | 220 | | | S1250 | D6-221 | | GP2K-221 | UC-5322 | 5GA-T22 | |
| C56 | .25 | 600 | | | | | | | | |
| C57A | .002 | | | P688-002 | | PTE6D2 | | PT622 | | |
| B | .005 | | ±CMX-10012 | P688-005 | ±PC-100 | PTE6D5 | ±1405-01 | PT625 | ±101C1 | |
| C | .005 | | | P688-005 | | PTE6D5 | | PT625 | | |
| C58 | .005 | 600 | | P688-005 | | PTE6D5 | GP2-333-502 | PT625 | 6TM-D5 | |
| C59 | .005 | 600 | | P688-005 | | PTE6D5 | GP2-333-502 | PT625 | 6TM-D5 | |
| C60 | .01 | 600 | | P688-01 | D5-103 | PTE6S1 | GP2-333-103 | PT611 | 6TM-S1 | |
| C61 | .1 | 600 | | P688-1 | DF-104 | PTE6P1 | | PT601 | 6TM-P1 | |

## CAPACITORS (CONT.)

| ITEM No. | RATING: CAP. | VOLT | Mirrortone PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C62 | .1 | 600 | | P688-1 | DF-104 | PTE6P1 | | PT601 | | |
| C63 | 270 | 500 | | | | | | | | |
| C64 | .001 | 600 | | P688-001 | D6-102 | PTE6D1 | GP2L-102 | PT621 | 6TM-D1 | |
| C65 | .001 | 600 | | P688-001 | D6-102 | PTE6D1 | GP2L-102 | PT621 | 6TM-D1 | |
| C66 | .005 | 600 | | P688-005 | D6-502 | PTE6D5 | GP3-333-502 | PT625 | 6TM-D5 | |
| C67 | .05 | 600 | | P688-05 | DF-503 | PTE6S5 | | PT615 | 6TM-S5 | |
| C68 | .004 | 400 | CPA-14402B | | | | | | | |
| C69 | 270 | 500 | | | | | | | | |
| C70 | 430 | 500 | | | | | | | | |
| C71 | 430 | 500 | | | | | | | | Note 4 |
| C72 | .05 | 600 | | P688-05 | DF-503 | PTE6S5 | | PT615 | 6TM-S5 | |
| C73 | .25 | 600 | | 684-25 | | PTE6P25 | | PT6025 | 6TM-P25 | |
| C74 | .25 | 600 | | 684-25 | | PTE6P25 | | PT6025 | 6TM-P25 | |
| C75 | 56 | 2000 | | | | | | | | |
| C76 | 5000 | | | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |
| C77 | 5000 | | | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |

Note 1. Some Models use 330MMF in this application.
Note 2. Some Models use a .005MFD in this application.
Note 3. Some Models use a .01MFD in this application.
Note 4. Some Models use a 270MMF in this application.
Note 5. Not used in all Models.
♦ Items C57A, C57B, C57C, R70A, R70B, R70C are combined in one unit.

## CONTROLS

| ITEM No. | RATING: RESISTANCE | WATTS | REPLACEMENT DATA: Mirrortone PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 750Ω | ½ | VC-12137D | QJ-346 * | RTV-297 | SBBT-682-S | WF13-T251 | Contrast-Tapped ⓐ 500Ω-rear |
| B | 250KΩ | ½ | | | | | UR254 | Volume-Rear |
| C | Switch | | | | | | UB-36 | Attach to R1B |
| R2A | 1.3Meg | ½ | VC-12132E | QU-138 | AG-83-S | AB-69 | U-56 | Vert. Hold |
| B | Shaft | | Not Req. | Not Req. | KSS-3 | AK-4 | Not Req. | Attach to R2A |
| R3A | 50KΩ | ½ | VC-12131E | QU-123 | AG-44-S | AB-31 | U-35 | Horiz. Hold |
| B | Shaft | | Not Req. | Not Req. | KSS-3 | AK-4 | Not Req. | Attach to R3A |
| R4A | 100KΩ | ½ | VCA-12135A | QU-128 | AG-49-S | AB-40 | SU-41 | AGC |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 | AK-1 | Not Req. | Attach to R4A |
| R5A | 5000Ω | ½ | VC-12120C | QU-114 | AG-19-S | AB-10 | SU-14 | Vert. Linearity |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 | AK-1 | Not Req. | Attach to R5A |
| R6A | 2.5Meg | ½ | VC-12121D | QU-139 | AG-84-S | AB-83 | SU-565 | Vert. Size |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 | AK-1 | Not Req. | Attach to R6A |
| R7A | 100KΩ | ½ | VCA-12135A | QU-128 | AG-49-S | AB-40 | SU-41 | Brightness |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 | AK-1 | Not Req. | Attach to R7A |

* CONCENTRIKIT EQUIVALENT - KIT K-2, BASE ELEMENTS & SHAFTS BIT-105X & P1-210 (Panel) B13-130 & R3-226 (Rear) & SWITCH 76-1.

## RESISTORS

| ITEM No. | RATING: OHMS | WATT | REPLACEMENT DATA: Mirrortone PART No. | IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R8 | 15KΩ | ½ | | | |
| R9 | 47KΩ | ½ | | BTS-47K | |
| R10 | 100KΩ | ½ | | | |
| R11 | 150KΩ | ½ | | | |
| R12 | 1500Ω | ½ | | BTS-1500 | |
| R13 | 100KΩ | ½ | | | |
| R14 | 10KΩ | ½ | | BTS-10K | |
| R15 | 220KΩ | ½ | | BTS-220K | |
| R16 | 10KΩ | ½ | | | |
| R17 | 15KΩ | ½ | | | |
| R18 | 2.2Meg | ½ | | BTS-2.2Meg | |
| R19 | 2.2Meg | ½ | | BTS-2.2Meg | |
| R20 | 8200Ω | 2 | | BTB-8200 | Note 2 |
| R21 | 8200Ω | 2 | | BTB-8200 | Note 2 |
| R22 | 10KΩ | 2 | | BTB-10K | |
| R23 | 680Ω | 2 | | BTB-680 | Note 3 |
| R24 | 470Ω | ½ | | BTS-470 | |
| R25 | 22KΩ | ½ | | | |
| R26 | 82Ω | ½ | | BTS-82 | |
| R27 | 100Ω | ½ | | BTS-100 | |
| R28 | 470Ω | ½ | | BTS-470 | |
| R29 | 8200Ω | ½ | | | |
| R30 | 82Ω | ½ | | BTS-82 | |
| R31 | 100Ω | ½ | | BTS-100 | |
| R32 | 1Meg | ½ | | BTS-1Meg | |
| R33 | 10KΩ | ½ | | | |
| R34 | 1Meg | ½ | | BTS-1Meg | |
| R35 | 180Ω | ½ | | BTS-180 | |
| R36 | 6800Ω | ½ | | | |
| R37 | 100Ω | ½ | | BTS-100 | |
| R38 | 180Ω | ½ | | BTS-180 | |
| R39 | 100Ω | ½ | | BTS-100 | |
| R40 | 8200Ω | ½ | | BTS-8200 | |
| R41 | 33Ω | ½ | | BTS-33 | |
| R42 | 1000Ω | ½ | | BTS-1000 | |
| R43 | 220KΩ | ½ | | BTS-220K | |
| R44 | 2700Ω | 2 | | BTB-2700 | |
| R45 | 1800Ω | 2 | | BTB-1800 | |
| R46 | 100KΩ | ½ | | BTS-100K | |
| R47 | 220KΩ | ½ | | BTS-220K | |
| R48 | 47KΩ | ½ | | BTS-47K | Note 1 |
| R49 | 47KΩ | ½ | | | |
| R50 | 1000Ω | ½ | | BTS-1000 | |
| R51 | 33KΩ | 1 | | | Note 4 |
| R52 | 1000Ω | 1 | | BTS-1000 | |
| R53 | 12KΩ | 1 | | | |
| R54 | 15KΩ | ½ | | BTS-15K | |
| R55 | 15KΩ | 1 | | BTS-15K | |

| ITEM No. | RATING: OHMS | WATT | REPLACEMENT DATA: Mirrortone PART No. | IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R56 | 10Meg | ½ | | BTS-10Meg | |
| R57 | 470KΩ | ½ | | BTS-470K | |
| R58 | 180KΩ | ½ | | BTS-180K | |
| | 5% | | | 5% | |
| R59 | 330KΩ | ½ | | BTS-330K 5% | |
| | 5% | | | | |
| R60 | 100KΩ | ½ | | BTS-100K | |
| R61 | 220KΩ | ½ | | BTS-220K | |
| R62 | 330Ω | 1 | | BTA-330 | |
| R63 | 18KΩ | ½ | | BTS-18K | |
| R64 | 470KΩ | ½ | | BTS-470K | |
| R65 | 2.2Meg | ½ | | BTS-2.2Meg | |
| R66 | 4700Ω | ½ | | BTS-4700 | |
| R67 | 47KΩ | ½ | | BTS-47K | |
| R68 | 100KΩ | ½ | | BTS-100K | |
| R69 | 15KΩ | ½ | | BTS-15K | |
| R70A | 22KΩ | ½ | | BTS-22K | |
| B | 8200Ω | ½ | ♦CMX-10012 | BTS-8200 | |
| C | 8200Ω | ½ | | BTS-8200 | |
| R71 | 330KΩ | ½ | | BTS-330K | |
| R72 | 33KΩ | ½ | | BTS-33K | |
| R73 | 100Ω | ½ | | BTS-100 | |
| R74 | 470KΩ | ½ | | BTS-470K | |
| R75 | 680KΩ | ½ | | BTS-680K | |
| R76 | 820KΩ | ½ | | BTS-820K | |
| R77 | 470KΩ | ½ | | BTS-470K | |
| R78 | 2.2Meg | ½ | | BTS-2.2Meg | |
| R79 | 56Ω | ½ | | BTS-56 | |
| R80 | 56Ω | ½ | | BTS-56 | |
| R81 | 47KΩ | ½ | | BTS-47K | |
| R82 | 47KΩ | ½ | | BTS-47K | |
| R83 | 100KΩ | ½ | | BTS-100K | |
| R84 | 680KΩ | ½ | | BTS-680K | |
| R85 | 470KΩ | ½ | | BTS-470K | |
| R86 | 47KΩ | ½ | | BTS-47K | Note 5 |
| R87 | 1500Ω | ½ | | BTS-1500 | |
| R88 | 5600Ω | ½ | | BTS-5600 | |
| R89 | 100KΩ | ½ | | BTS-100K | |
| R90 | 220KΩ | ½ | | BTS-220K | |
| R91 | 1Meg | ½ | | BTS-1Meg | |
| R92 | 68Ω | ½ | | | |
| R93 | 6800Ω | 2 | | BTB-6800 | |
| R94 | 3900Ω | 2 | | BTB-3900 | Note 1 |
| R95 | 2.2Ω | 1 | | | Note 1 |
| R96 | 8200Ω | 2 | | BTB-8200 | |
| R97 | 200Ω | 10 | | 1 3/4A-200 | |
| R98 | 1500Ω | 1 | | BTA-1500 | |
| R99 | 220KΩ | ½ | | BTS-220K | Note 1 |

Note 1. Not used in all Models.
Note 2. Some Models may use a single 4100Ω (4 watt) resistor in this application.
Note 3. Some Models may use a 470Ω resistor in this application.
Note 4. Some Models may use a 39KΩ resistor in this application.
Note 5. Some Models may use a 68KΩ resistor in this application.
♦ Items R70A, R70B, R70C, C57A, C75B, C75C are combined in one unit.

## TRANSFORMER (POWER)

| ITEM No. | RATING: PRI. | SEC. 1 | SEC. 2 | SEC. 3 | REPLACEMENT DATA: Mirrortone PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. | RCA TYPE No. |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 117VAC ⓐ1.8A | 730VCT .190ADC | 5VAC ⓐ 3A | 6.3VAC ⓐ 1.2A<br>SEC. 4<br>6.3VAC<br>ⓐ 6.9A | TPC-10011 | P-8163 ① | P-3078 | TP-360 ① | H-37BC | 30IT10 |

① Drill new mounting holes.

## TRANSFORMER (SWEEP CIRCUITS)

| ITEM No. | RATING: DC RESISTANCE PRI. | SEC. | REPLACEMENT DATA: Mirrortone PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. | RCA TYPE No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| T2 | 259Ω tap ⓐ 24Ω | 10Ω tap ⓐ .5Ω, 7.3Ω<br>SEC. 2<br>2.5Ω<br>SEC. 3<br>0Ω | THC-10017-C | | | | | | Horiz. Output Trans. |
| T3 | 1080Ω tap ⓐ 10.6Ω | 16Ω | TOB-10045H | A-8123 | A-3037 | TSO-8 | A-102K | | Vert. Output Trans. |
| T4A | 16Ω | | YDB-10001C | DY-8A ① | MDF-70 | TT-5 | Y-31 ② | | Horiz. Deflection Coils |
| B | 61Ω | | | | | | | | Vert. Deflection Coils |
| T5 | 1.4Ω | | TO-10023C | WC-1 | MWC-2 ③ | TW-1 | | | Width Coil |

① Use original horizontal deflection coil network if necessary.
② Use original horizontal deflection coil network.
③ Enlarge mounting hole.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING: IMPEDANCE PRI. | SEC. | DC RES. PRI. | SEC. | REPLACEMENT DATA: Mirrortone PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| T6 | 5.1KΩ | 3.5Ω | 340Ω | .52Ω | TOC-10034 | A-3877Ⓒ | A-2930 ① | RO-9 ① | S-3X ① | ① Drill one new mounting hole. |

## SPEAKER

| ITEM No. | RATINGS: SIZE | FIELD | V. C. IMP. | REPLACEMENT DATA: Mirrortone PART No. | VIKING PART No. | QUAM PART No. | NOTES |
|---|---|---|---|---|---|---|---|
| SP1A | 10" | PM | 3.5Ω | SRC-10024A | 10J11 | 10A31 | ① Alternate Speaker |
| B | 8" | PM | 3.5Ω | SRC-10025 ① | 8J9 | 8A21 | |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. PRI. | SEC. | REPLACEMENT DATA: Mirrortone PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|
| L1 | Ant. Coils | 0Ω CT | 0Ω | | | | | |
| L2 | Fil. Choke | 0Ω | | | | | | |
| L3 | Neutr. Coil | 0Ω | | | | | | |
| L4 | RF, Mixer Grid & Osc. Coils | 0Ω | | | | | | |
| L5 | Fil. Choke | 0Ω | | | | | | |
| L6 | RF Choke | 0Ω | | | | | | |
| L7 | 1st. Video IF | 1Ω | | | | | | |
| L8 | RF Choke | 1.3Ω | | | | | | |
| L9 | 2nd. Video IF | .1Ω | .1Ω | TSA-10054B | 17-1062 | | 6250 | |
| L10 | Fil. Choke | 0Ω | | LGA-10019A | 19-3001 | TV-189 | 6175 | |
| L11 | 3rd. Video IF | .1Ω | .1Ω | TSA-10054B | 17-1063 | | 6249 | |
| L12 | 4th. Video IF | .1Ω | .1Ω | TSA-10054B | 17-1063 | | 6249 | |
| L13 | 5th. Video IF | .1Ω | .1Ω | TSA-10054B | 17-1064 | | 6250 | |
| L14 | Series Peaking Coil | 7Ω | | LGA-10032 | 19-3125 | | 6153 | 120 Microhenries |
| L15 | Shunt Peaking Coil | 9Ω | | LGA-10033 | 19-3180 | TV-184 | 6180 | 180 Microhenries |
| L16 | Series Peaking Coil | 8.5Ω | | LGA-10034 | 19-3093 | TV-181 | 6177 | 100 Microhenries |
| L17 | Sound IF | 1.8Ω | | TSA-10059C | 17-3400 | TV-151 | 1470 | |
| L18 | Ratio Det. | 1Ω | .3Ω CT | TSB-10082A | 17-1033 | TV-110 | 1468 | Tertiary Winding-.25Ω |
| L19 | Horiz. Osc. | 65Ω | | LGA-10017B | 19-1576 | TV-163 | 6210 | |

## FUSES

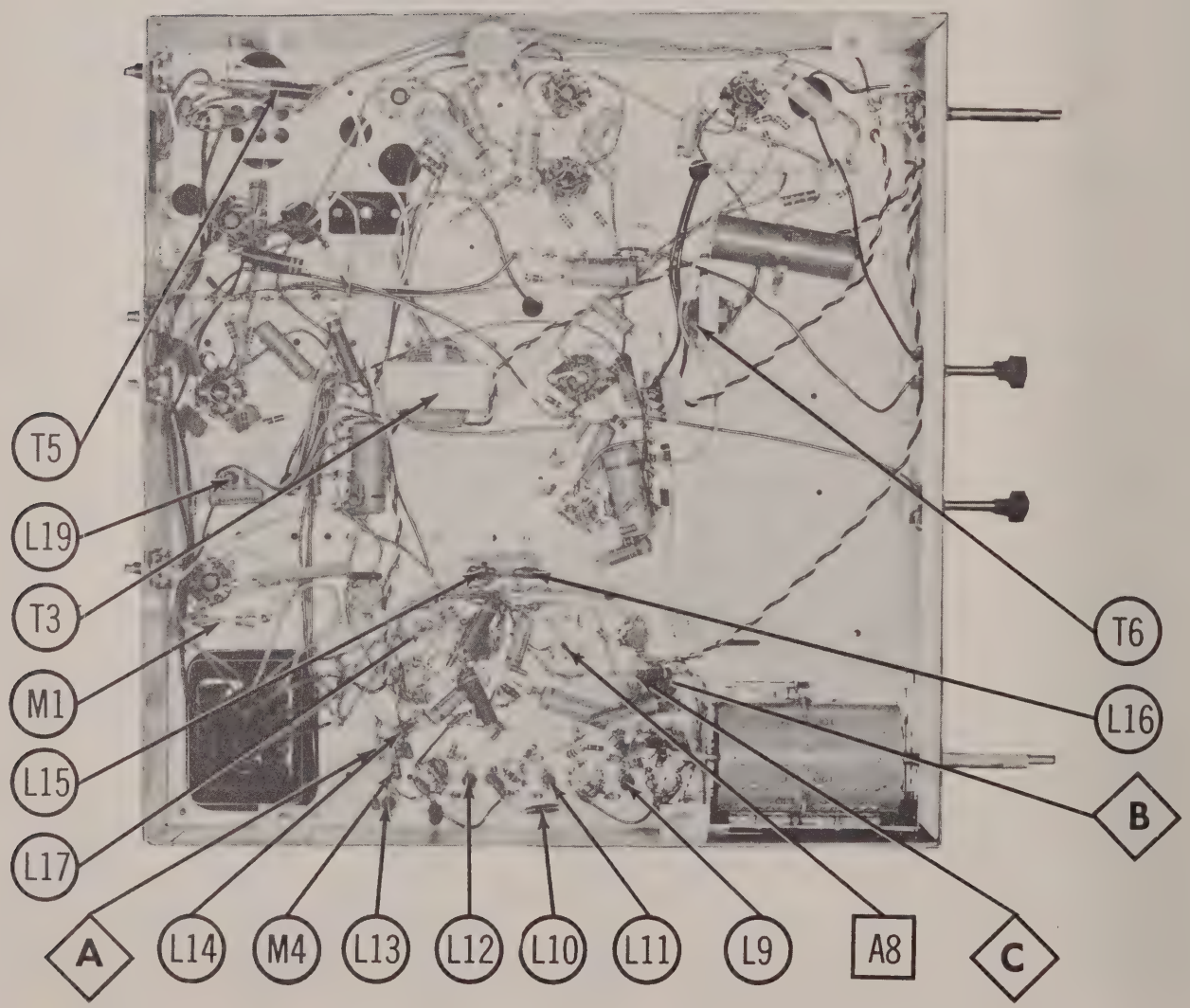
| ITEM No. | TYPE | RATING | REPLACEMENT DATA: Mirrortone PART No. FUSE | HOLDER | LITTELFUSE PART No. FUSE | HOLDER | BUSS PART No FUSE | HOLDER |
|---|---|---|---|---|---|---|---|---|
| M1 | 3AG (S/B) | 1/2 A. 125V. | | | 313.500 (3AG - SA. S/B) | 121002 (2 Used) | MDL 1/2 | 4592 (2 used) |
| M2 * | 3AG | 5 A. 250V. | | | 312005 (3AG - 5A.) | 341001 | MTH5 | HKP |

* Not used in all Models.

# PARTS LIST AND DESCRIPTIONS (Continued)

## MISCELLANEOUS

| ITEM No. | PART NAME | Mirrortone PART No. | NOTES |
|---|---|---|---|
| M3 | RF Tuner | TT-10012 | |
| M4 | Crystal Diode | | Video Detector (1N60) |
| M5 | Centering Magnet | MDA-10002 | |
| M6 | Ion Trap | ITA-10003 | |
| B2 | Trimmer Cap. | CTA-10005 | Horiz. Drive, 25-280MMF |
| | Cabinet | ZWE-10147M | Model A-17C, A-21C |
| | Cabinet | ZWE-10157L | Model A-17T, A-21T |
| | Cabinet | ZWD-10152H | Model A-21X |
| | Cabinet | ZWD-10147M | Model A-21Z |
| | Back Cover | XCD-10065 | Models A-17C, A-17T, A-21C, A-21T |
| | Back Cover | XCD-10067D | Models A-21X, A-21Z |
| | Safety Glass | DWC-10040 | Models A-17C, A-17T, A-21C, A-21X |
| | Cover (Control Door) | NB-10122 | |
| | Knob | KB-10107B | Picture, Models A-17C, A-17T, A-21C, A-21T, A-21X |
| | Knob | KB-10108A | Fine Tuning Models A-17C, A-17T, A-21C, A-21T, A-21X |
| | Knob | KB-10109 | Channel Selector Models A-17C, A-17T, A-21C, A-21T, A-21X |
| | Knob | KB-10110 | Off/On Volume Models A-17C, A-17T, A-21C, A-21T, A-21X |
| | Knob | KA-10148 | Horiz. Hold, Vert. Hold (2 Used) Models A-17C, A-17T, A-21C, A-21T, A-21X |




CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENT.

# TROUBLE SHOOTING AIDS (CONT.)

PROPERTY OF

## VIDEO

**SOUND BARS**

Check by substitution A6 (4.5MC Trap). Check setting of local oscillator and alignment of video IF stages.

**POOR RESOLUTION**

Check alignment of tuner and IF stages. Substitute V7 and check associated components.

**SMEAR**

Substitute V7 and check circuit components.

**ONE WIDE BLACK BAR ACROSS PICTURE**

Check tuner, video IF and video amplifier for filament to cathode leakage. Check tube sockets for same thing.

**POOR CONTRAST**

Check waveform W1;

| If Unsatisfactory | If Satisfactory |
|---|---|
| Check alignment of video IF and tuner. Check associated components. | Check waveform W2. |

Check waveform W2,

| If Unsatisfactory | If Satisfactory |
|---|---|
| Substitute V7 and check associated components. | Check picture tube grid components. Check picture tube. |

## AUDIO

**WEAK OR NO SOUND**

Substitute V8, V9, V10 and V11. Check alignment of sound and video IF.

**BUZZ**

Adjust ratio detector secondary for minimum buzz. Substitute V9 . Check local oscillator setting. Check for overloading at waveform W1. If overloated exists, check AGC network.

**DISTORTED**

Check audio stages using audio signal generator and scope.

| If Undistorted | Distorted |
|---|---|
| Check alignment of sound IF and ratio detector. | Substitute V10, V11 . Check circuit components. |

## HIGH VOLTAGE

**LOSS OF HIGH VOLTAGE**

Check waveform W15;

| If Unsatisfactory | If Satisfactory |
|---|---|
| Substitute V15 and check circuit components particularly L19. | Substitute V16, V17 and V18. Check T2, T4A , T5 and associated components. |

**WEAK HIGH VOLTAGE**

If substitution of V15, V16, V17 and V18 does not correct trouble, follow procedure outlined under "LOSS OF HIGH VOLTAGE".

**BLOOMING**

If substitution of V15, V16, V17, V18 and V19 does not correct trouble, follow procedure outlined under "LOSS OF HIGH VOLTAGE".

## POWER

**SMALL RASTER**

Substitute V19 and check filter components. Check B+ circuit for shorts.

**DIM PICTURE**

Substitute V19 and check B+ components.

## GENERAL

**NO PICTURE NO SOUND NO SNOW**

Substitute V2 and V7. Check associated components.

**WEAK PICTURE AND WEAK SOUND**

Substitute V3, V4 and V5. Check video IF alignment.

**SOUND WITH WEAK PICTURE**

Substitute V1 and check tuner alignment and components.

**RECEIVER INOPERATIVE**

Substitute V19. Check 1/4 Amp fuse holder under chassis. Check B+ components.

The Trouble-Shooting photographs shown are made with permission of transmitting station WFBM-TV and in no way reflect the quality of the transmitted picture. Similarly, symptoms shown are assumed and are not indicative of the quality and workmanship of this receiving equipment.

# SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the RF Tuner Oscillator Circuit may be accomplished by removal of the Channel Selector and Fine tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the channel selector shaft.

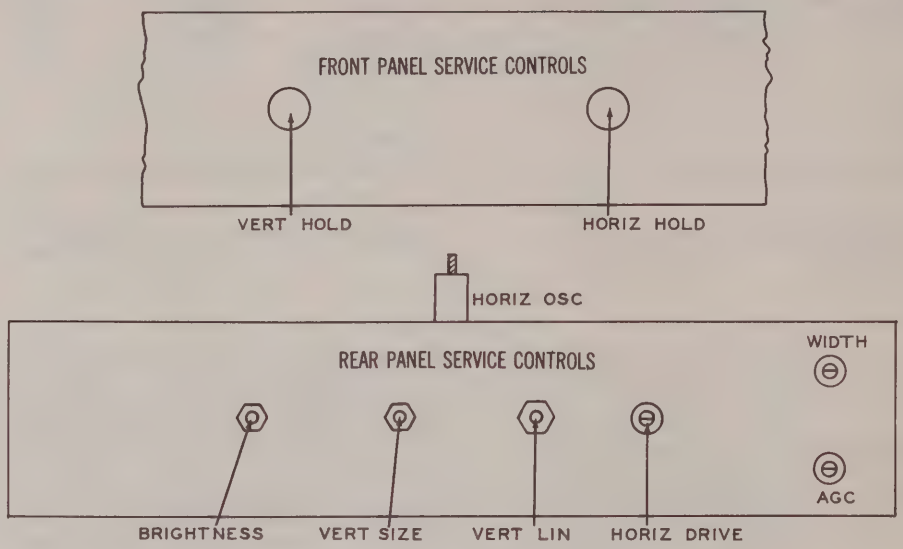
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass , remove three wood screws holding wood strip at top of cabinet. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION




SPECIAL ADJUSTMENTS - AGC CONTROL ADJUSTMENT

Tune receiver to strongest TV station available. Set contrast control fully clockwise and adjust AGC control clockwise as far as possible without distortion or instability of picture.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis. Set the horizontal hold control at the center of its range and adjust the horizontal oscillator slug (L19) until, picture synchronizes horizontally. (For location, see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector buzz, adjust the ratio detector secondary (L18) located on bottom of chassis. (See tube placement chart).

FUSES

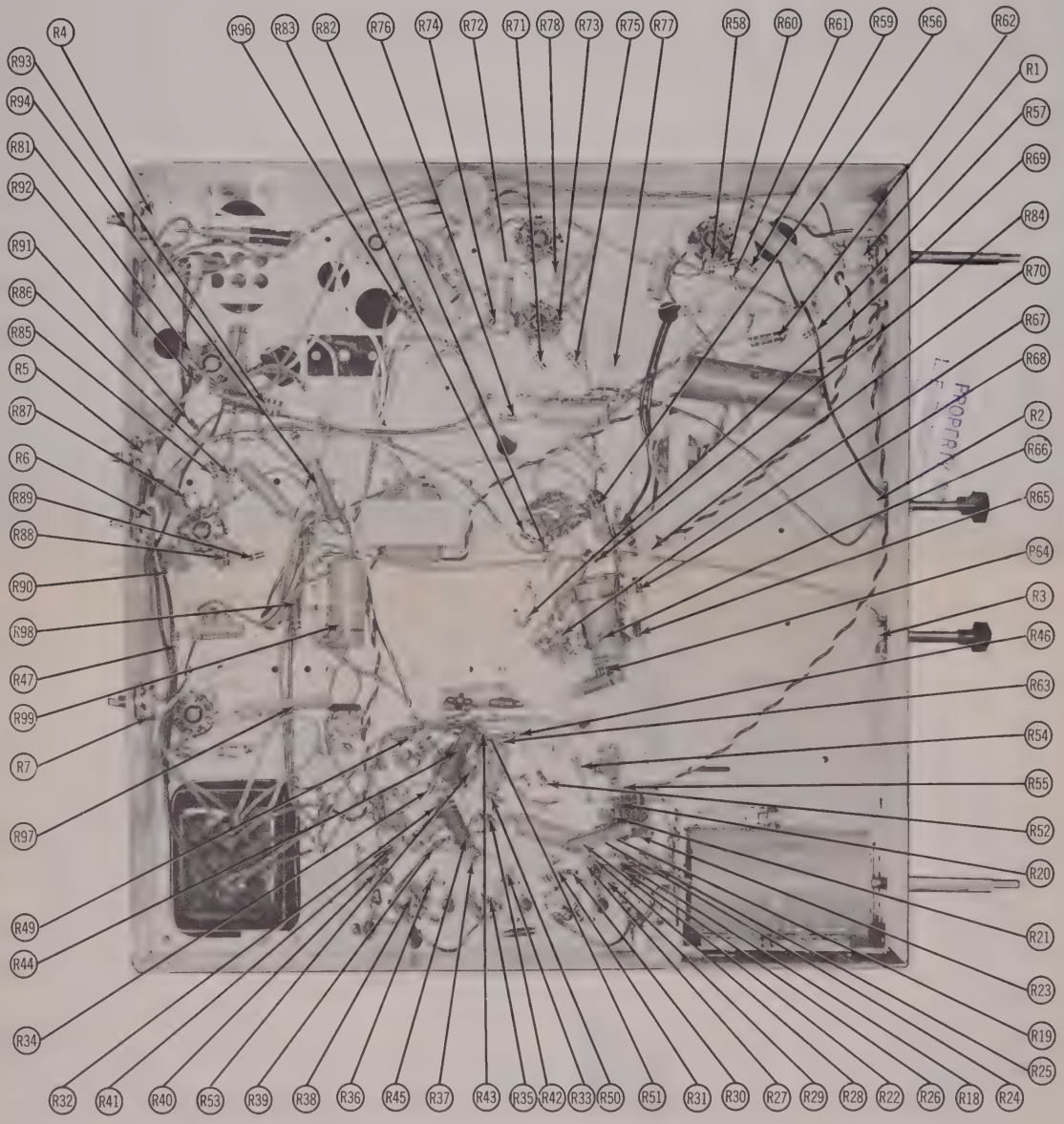
One fuse is used for LV Power Supply protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting a magnetic ring around the neck of the picture tube located flush against the yoke. Turn the dish like knob and at the sams time rotate the ring around the tube until the picture is properly centered.

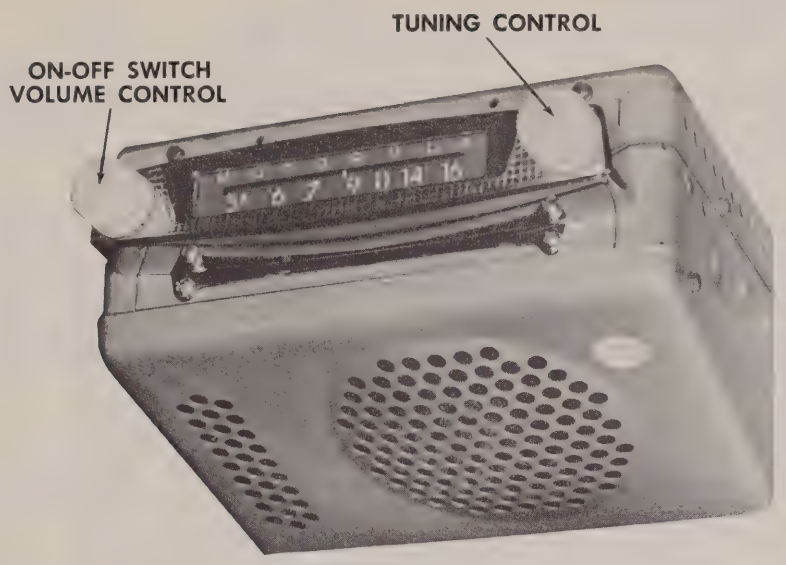
# DISASSEMBLY INSTRUCTIONS

1. Remove 4 push on type control knobs from front panel.
2. Remove 7 wood screws. Remove rear cover.
3. Disconnect built-in antenna . Remove 2 wood screws. Remove antenna bracket.
4. Disconnect speaker. Remove 2 speaker nuts. Remove speaker. (Not necessary for chassis removal.)
5. Remove 1 wood screw from CRT support.
6. Remove 4 chassis bolts. Remove chassis.




CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE
DENVER




| | |
|---|---|
| TRADE NAME | Motorola Model 403 |
| MANUFACTURER | Motorola Inc., 4545 Augusta Blvd., Chicago 39, Ill. |
| TYPE SET | Battery Operated Universal Automobile Superheterodyne Receiver |
| TUBES (Six) | Types 6BD6 RF Amp., 6BE6 Conv., 6BD6 IF Amp. 6AT6 Det.-AVC-AF Amp., 6AQ5 Audio Output, 6X4 Rectifier |
| POWER SUPPLY | 6 Volt Storage Battery — RATING 5.2 Amp. @ 6.3 Volts DC |
| TUNING RANGE—BROADCAST | 540-1605 KC |

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than enecessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .1MFD | High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis. | 455KC (400~Mod) | High frequency end of dial. | Across voice coil | A1, A2, A3, A4 | Adjust in order given for maximum output. |
| 2. | Fig. 1 | Thru dummy to antenna receptacle. | 1605KC | " | " | A5 | Adjust for maximum output. |
| 3. | " | " | 1400KC | Tune to 1400KC signal | " | A6, A7 | " |
| | The following adjustments should be made only if tuner components have been replaced or tampered with. | | | | | | |
| 4. | Fig. 1 | Thru dummy to antenna receptacle | 1610KC | Tune to high frequency end stop. Cores should project 1 1/32" from end of coil form. Adjust if necessary. | Across voice coil | A5, A6, A7 | Adjust in order given for maximum output. |
| 5. | " | " | 1400KC | 1400KC (See Fig. 2) | " | A8, A9, A10 | " |
| | Install receiver in car, fully extend antenna and peak A7 for maximum volume on weak signal near 1400KC. | | | | | | |

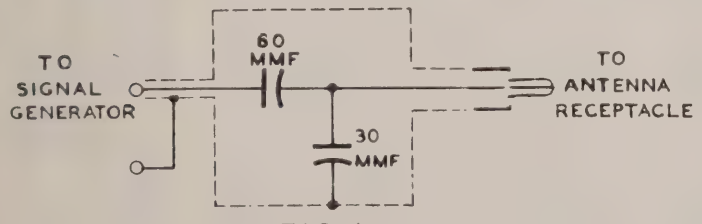



FIG. 1

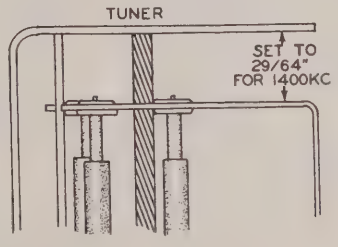



FIG. 2

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America



MOTOROLA
MODEL 403

MOTOROLA
MODEL 403

# PARTS LIST AND DESCRIPTIONS

MOTOROLA MODEL 403

## TUBES (SYLVANIA, GENERAL ELECTRIC or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA | | RTMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| | | MOTOROLA PART No. | STANDARD REPLACEMENT | | |
| V1 | RF Amplifier | 6BD6 | 6BD6 | 7BK | |
| V2 | Converter | 6BE6 | 6BE6 | 7CH | |
| V3 | IF Amplifier | 6BD6 | 6BD6 | 7BD | |
| V4 | Det-AVC-AF Amp. | 6AT6 | 6AT6 | 7BT | |
| V5 | Audio Output | 6AQ5 | 6AQ5 | 7BZ | |
| V6 | Rectifier | 6X4 | 6X4 | 5BS | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | MOTOROLA PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C1A | ■15 | 350 | 23A485677 | AFH3-104 | | CO77 | | FP328 | TVL-3630 | |
| B | ▲10 | 350 | | | | | | | | |
| C | 20 | 25 | | | | | | | | |
| C2 | 90 | | 21A591682 | | | | | | | |
| C3 | .006 | 100 | 8A4529 | P488-004 | | PJ6D6 | | PT626 | 6TM-D6 | |
| C4 | 5 | | 21K70720 | SI5 | TCZ-4.7 | 5W5V5 | GP1K-050 | ZT-555 | 5GA-V5 | |
| C5 | 47 | | 21R115593 | SI47N750 | TCN-47 | | N750K-470 | NT-5447 | 5TCU-Q47 | |
| C6 | .05 | 400 | 8R14791 | P488-05 | DF-503 | PTE4S5 | | PT415 | 4TM-S5 | |
| C7 | .05 | 100 | 8R13514 | P288-05 | DF-503 | PJ2S5 | | PT415 | 2TM-S5 | |
| C8 | .01 | 100 | 8R472754 | P488-01 | D6-103 | PTE4S1 | GP2-333-103 | PT411 | 4TM-S1 | |
| C9 | .01 | 400 | 8R23690 | P488-01 | D6-103 | PTE4S1 | GP2-333-103 | PT411 | 4TM-S1 | |
| C10 | 470 | | 21K481377 | SI470 | D6-471 | TM5T5 | GP2K-471 | UC-5347 | 5GA-T47 | |
| C11 | .004 | 400 | 8K71909 | P688-004 | D6-402 | PJ6D4 | | PT624 | 6TM-D4 | |
| C12 | .03 | 1000 | 8K400883 | P1088-03 | | PJ16S3 | | PT1613 | MB-S3 | |
| C13 | .5 | 100 | 8K17028 | VHC36 | | MP2P5 | | RF480 | 68P20 | |
| C14 | .5 | 100 | 8K17028 | VHC36 | | MP2P5 | | RF480 | 68P20 | |

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | MOTOROLA PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | MALLORY PART No. | |
| R1A | 500KΩ | ½ | 18K501294 | Q13-133 | AG-60-Z | B-60-S | U-48 | Volume |
| B | Shaft | | Not Req. | Not Req. | RS-2 | Not Req. | Not Req. | Attach to R1A |
| C | Switch | | Not Req. | 76-1 | SWB | Not Req. | US-26 | Attach to R1A |

## RESISTORS

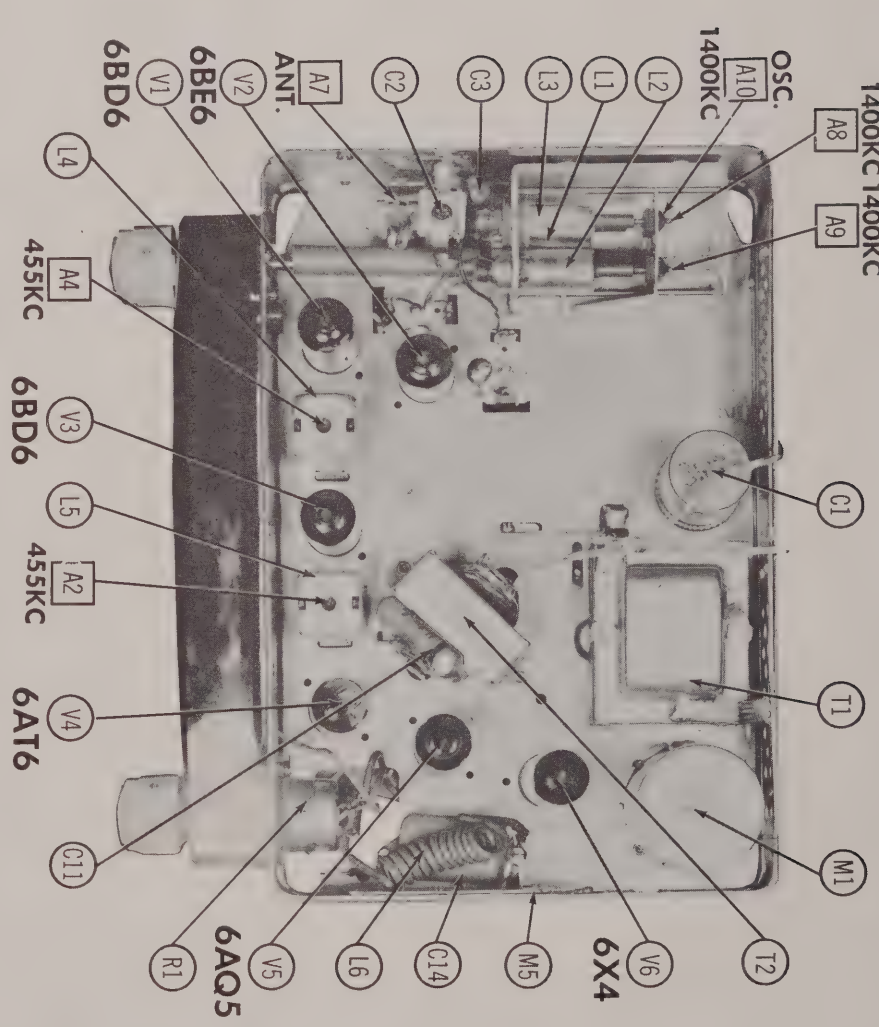
| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | MOTOROLA PART No. | IRC PART No. | |
| R2 | 1 Meg | ½ | 6R6004 | BTS-1 Meg | |
| R3 | 220Ω | ½ | 6R6270 | BTS-220 | |
| R4 | 100KΩ | ½ | 6R6075 | BTS-100K | |
| R5 | 47KΩ | ½ | 6R6056 | BTS-47K | |
| R6 | 330Ω | ½ | 6R6022 | BTS-330 | |
| R7 | 6800Ω | 2 | 6R5690 | BTB-6800 | |
| R8 | 1 Meg | ½ | 6R6004 | BTS-1 Meg | |

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | MOTOROLA PART No. | IRC PART No. | |
| R9 | 4.7Meg | ½ | 6R2122 | BTS-4.7Meg | |
| R10 | 470KΩ | ½ | 6R6032 | BTS-470K | |
| R11 | 270KΩ | ½ | 6R6414 | BTS-270K | |
| R12 | 270Ω | 1 | 6R6336 | BTA-270 | |
| R13 | 2200Ω | 2 | 6R5687 | BTB-2200 | |
| R14 | 56Ω | ½ | 6R5614 | BTS-56 | |
| R15 | 56Ω | ½ | 6R5614 | BTS-56 | |

## TRANSFORMER (VIBRATOR)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | SEC. 3 | MOTOROLA PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. |
| T1 | 6.3VCT @2.8A | 420VCT .042ADC | | | 25C501303 | | | | |

## CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | IMPEDANCE | | DC RES. | | MOTOROLA PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. | |
| | PRI. | SEC. | PRI. | SEC. | | | | | | |
| T2 | 5.3KΩ | 3.1Ω | 390Ω | .62Ω | 25B70171 | A-3878 | A-2930 | RO-9 ① | S-3X | ①Drill one new mtg. hole. |

## SPEAKER

| ITEM No. | RATINGS | | | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | MOTOROLA PART No. | JENSEN PART No. | QUAM PART No. | |
| SP1 | 5 1/4" | PM | 3.1Ω | 50K522339<br>50K521882 ① | ST-803 Mod. P525-V | 52A1 | ① Alternate speaker 5 1/4" PM |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. | | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | PRI. | SEC. | MOTOROLA PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | |
| L1 | Ant. Coil | 12.5Ω | | 24B502472 | | | | Less core:Core part #46A502505 |
| L2 | RF Coil | 12.5Ω | | 24B502473 | | | | Less core:Core part #46A502505 |
| L3 | Osc. Coil | .5Ω | 3.4Ω | 24B502474 | | | | Less core:Core part #46A502505 |
| L4 | Input IF | 17Ω | 17Ω | 24C485553 | 16-6758 | BC-352 | 12-C1 | |
| L5 | Output IF | 18Ω | 17Ω | 24K485554 | 16-6770 | BC-355 | 12-C6 | |
| L6 | Fil. Choke | 0Ω | | 24K580706 | | | | |
| L7 | Vibrator Hash Choke | .05Ω | | 24A472535 | | | 5221 | 15.2Microheneries |

## VIBRATOR

| ITEM No. | TYPE | INPUT VOLTS | FREQUENCY | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | | | MOTOROLA PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | RADIART PART No. | |
| M1 | Interrupter | 6.3 | 115v | 48B3333 | 5342 | 859 | 5342 | |

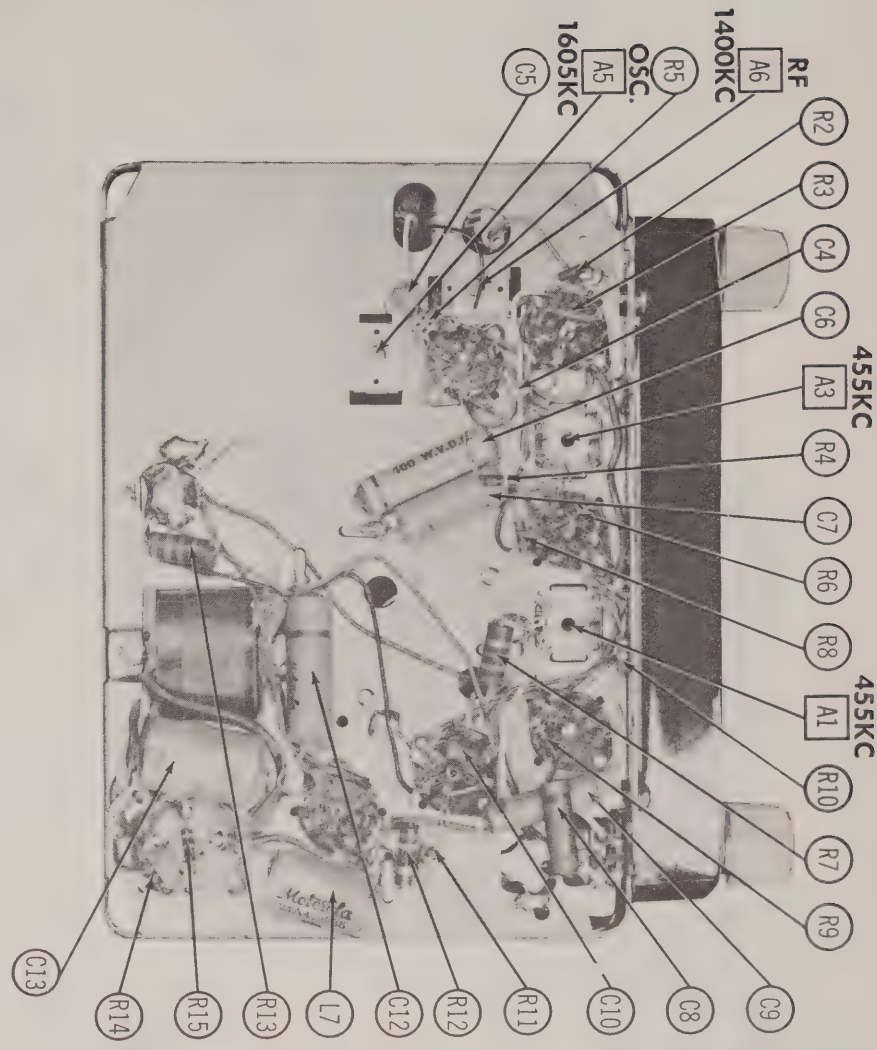
## FUSES

| ITEM No. | TYPE | RATING | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | MOTOROLA PART No. | | LITTELFUSE PART No. | | BUSS PART No. | |
| | | | FUSE | HOLDER | FUSE | HOLDER | FUSE | HOLDER |
| M2 | SFE | 9A | 65K16248 | 9K592648 (Includes lead and fuse) | 307009 (SFE-9 Amp.) | 15509 (Lead supplied upon request) | SFE9 | HRH (Includes lead and fuse) |

## MISCELLANEOUS

| ITEM No. | PART NAME | MOTOROLA PART No. | NOTES |
|---|---|---|---|
| M3 | Dial Light | 65X10867 | Bayonet Type #44 |
| M4 | Tuner | 51D502490 | MT-87 Complete |
| M5 | Spark Plate Assy. | 1V500379 | |
| A5 | Trimmer Capacitor | 20A485708 | (395-470MMF) Osc. Trimmer |
| A6 | Trimmer Capacitor | 20A48156 | (20-180MMF) RF Trimmer |
| A7 | Trimmer Capacitor | 20A502338 | (50-180MMF) Ant. Trimmer |
| | Background | 7K521680 | Bracket, Pointer & Dial |
| | Cover (Top) | 15K521711 | Less Speaker |
| | Cover (Bottom) | 15K521709 | |
| | Escutcheon | 13D521747 | Dial |
| | Plate | 64K521678 | Dial Scale Background |
| | Pointer & Slider Assembly | 1A501293 | |
| | Scale | 34K502385 | Dial |
| | Knob | 36K521779 | Tuning & Volume |

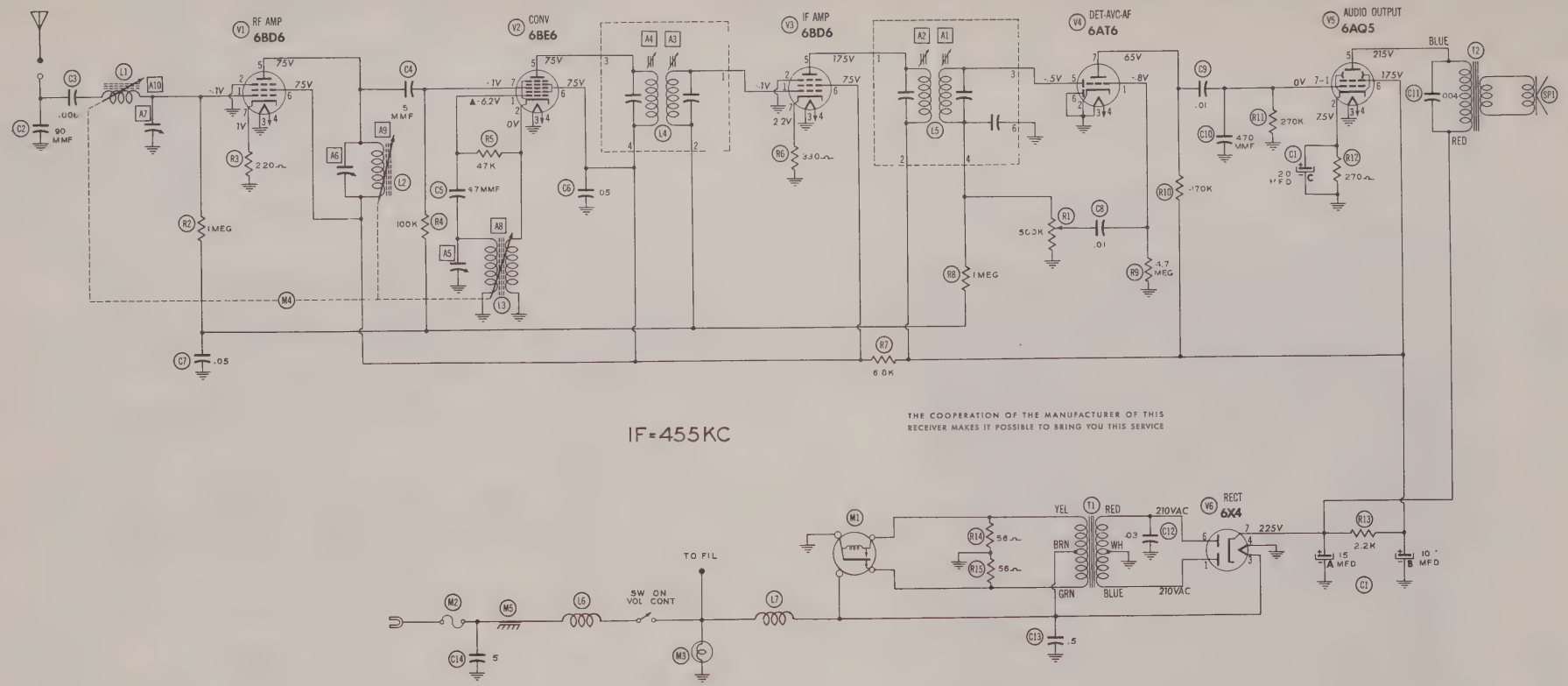
# CHASSIS—BOTTOM VIEW








MOTOROLA MODEL 403




RESISTANCE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V 1 | 6BD6 | 2.5Meg | 0Ω | 0Ω | .1Ω | †9KΩ | †9KΩ | 220Ω |
| V 2 | 6BE6 | 47KΩ | 3.4Ω | 0Ω | .1Ω | †9KΩ | †9KΩ | 1.6Meg |
| V 3 | 6BD6 | 1.5Meg | 0Ω | 0Ω | .1Ω | †2.2KΩ | †9KΩ | 330Ω |
| V 4 | 6AT6 | 4.7Meg | 0Ω | 0Ω | .1Ω | 500KΩ | 0Ω | †470KΩ |
| V 5 | 6AQ5 | 270KΩ | 270Ω | 0Ω | .1Ω | †390Ω | †2.2KΩ | 270KΩ |
| V 6 | 6X4 | 450Ω | .1Ω | .1Ω | 0Ω | INF | 415Ω | 1.5Meg |

▲ TAKEN WITH VACUUM TUBE VOLTMETER
† MEASURED FROM PIN 7 OF V6.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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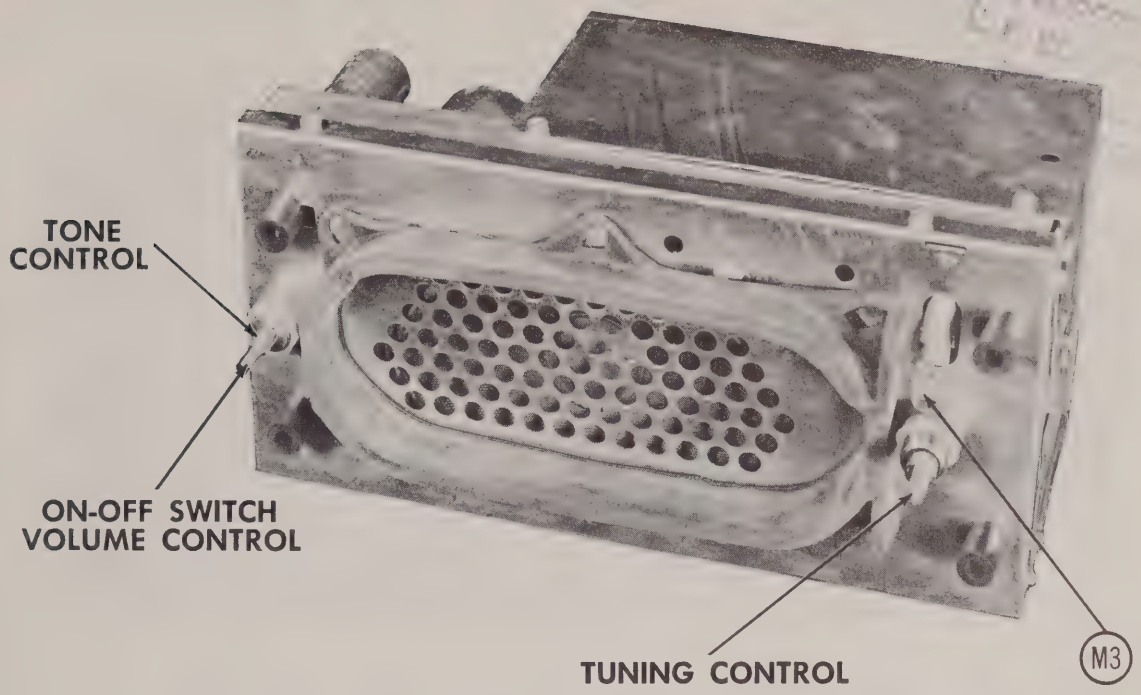
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 6.3 Volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

NASH
MODEL NH3C




NASH
MODEL NH3C

| | |
|---|---|
| TRADE NAME | Nash Model NH3C (For 1953 Nash Rambler Automobiles) |
| MANUFACTURER | Motorola Inc., 4545 Augusta Blvd., Chicago 51, Ill. |
| TYPE SET | Battery Operated Custom-Built Automobile Superheterodyne Receiver |
| TUBES (Five) | Types 6BE6 Conv., 6BA6 IF Amp., 6AV6 Det.-AVC-AF Amp., 6AS5 Audio Output, 6X4 Rectifier |
| POWER SUPPLY | 6 Volt Storage Battery — RATING 4.3 Amp. @ 6.3 Volts DC |
| TUNING RANGE—BROADCAST | 540-1600KC |

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .1MFD | High side to pin 7 (grid) of 6BE6 (V1). Low side to chassis. | 455KC (400~Mod | Tuning gang fully open | Across voice coil | A1, A2, A3, A4 | Adjust in order given for maximum output. |
| 2. | Fig. 1 | Thru dummy to antenna receptacle. | 1605KC | " | " | A5 | Adjust for maximum output. |
| 3. | " | " | 1400KC | Tune to 1400KC signal | " | A6 | " |
| 4. | " | " | 600KC | Tune to 600KC signal | " | A7 | Adjust for maximum output while rocking tuning gang. |
| 5. | Repeat steps 3 and 4 until no further improvement is noted. Make final adjustment with A6. | | | | | | |
| 6. | Install set in car and extend antenna to full height. Adjust A6 for maximum volume on weak signal near 1400KC. | | | | | | |

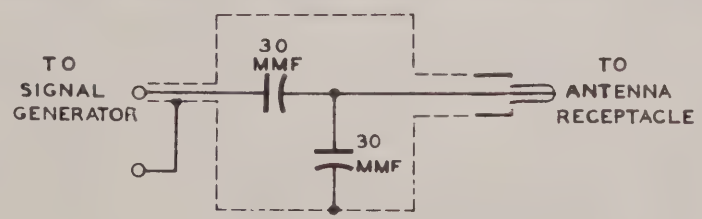



FIG. 1

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# PARTS LIST AND DESCRIPTIONS



## TUBES (SYLVANIA, GENERAL ELECTRIC or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA: MOTOROLA PART No. | REPLACEMENT DATA: STANDARD REPLACEMENT | RTMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| V1 | Converter | 6BE6 | 6BE6 | 7CH | |
| V2 | IF Amplifier | 6BA6 | 6BA6 | 7BK | |
| V3 | Det-AVC-AF Amp. | 6AV6 | 6AV6 | 7BT | |
| V4 | Audio Output | 6AS5 | 6AS5 | 7CV | |
| V5 | Rectifier | 6X4 | 6X4 | 5BS | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING: CAP. | RATING: VOLT | REPLACEMENT DATA: MOTOROLA PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C1A | ■20 | 250 | 23A500059 | AFH3-88 | | CO78 | | | TVL-3634 | |
| B | ▲10 | 250 | | | | | | | | |
| C | 10 | 25 | | | | | | | | |
| C2 | .05 | 100 | 8R13514 | P288-05 | DF-503 | PJ2S5 | | PT415 | 2TM-S5 | |
| C3 | .05 | 400 | 8R23146 | P488-05 | DF-503 | PTE4S5 | | PT415 | 4TM-S5 | |
| C4 | .01 | 100 | 8R472754 | P488-01 | D6-103 | PTE4S1 | GP2-333-103 | PT411 | 4TM-S1 | |
| C5 | .01 | 200 | 8R23053 | P488-01 | D6-103 | PTE4S1 | GP2-333-103 | PT411 | 4TM-S1 | |
| C6 | 330 | 500 | 2IR2744 | SI330 | D6-331 | | GP2K-331 | UC-5333 | 5GA-T33 | |
| C7 | .006 | 400 | 8K71910 | P688-004 | D6-402 | PJ6D4 | GP2-333-602 | PT626 | 6TM-D6 | |
| C8 | .02 | 100 | 8R51209 | P288-02 | DF-203 | PTE4S2 | | PT412 | 2TM-S2 | |
| C9 | .01 | 400 | 8R23690 | P488-01 | D6-103 | PTE4S1 | GP2-333-103 | PT411 | 4TM-S1 | |
| C10 | .03 | 600 | 8R592154 | P688-03 | | PTE6S3 | | PT613 | 6TM-S3 | |
| C11 | .25 | 100 | 8R4283 | P488-25 | | PJ2P25 | | PT4025 | 2TM-P25 | |
| C12 | .5 | 100 | 8K17028 | VHC36 | | MP2P5 | | RF480 | 68P20 | |

## CONTROLS

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: MOTOROLA PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 1 Meg | | 18B501837 | QJ-488A* | | | UF16L | Tone-Panel |
| B | 500KΩ | | | | | | UR55T154 | Volume Tap @150KΩ-Rear |
| C | Switch | | | | | | US-26 | Attach to R1B |

* CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS B11-137 & P1-204 (Panel) B13-133 X & R4-221 (Rear) & SWITCH 76-1.

## RESISTORS

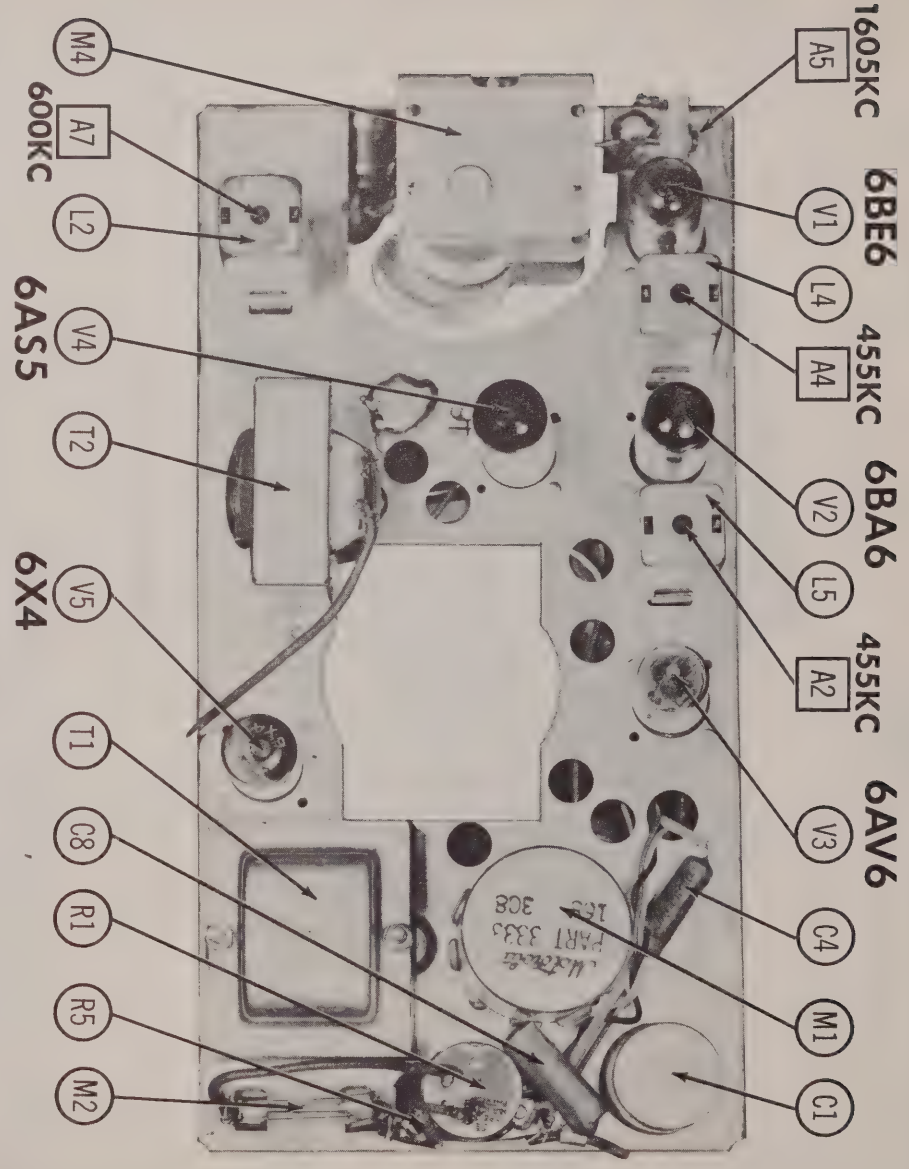
| ITEM No. | RATING: OHMS | RATING: WATT | REPLACEMENT DATA: MOTOROLA PART No. | IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R2 | 33KΩ | ½ | 6R6012 | BTS-33K | |
| R3 | 1Meg | ½ | 6R6004 | BTS-1Meg | |
| R4 | 82Ω | ½ | 6R2035 | BTS-82 | |
| R5 | 18KΩ | ½ | 6R5591 | BTS-18K | |
| R6 | 6800Ω | ½ | 6R6428 | BTS-6800 | |
| R7 | 6.8Meg | ½ | 6R3987 | BTS-6.8Meg | |

| ITEM No. | RATING: OHMS | RATING: WATT | REPLACEMENT DATA: MOTOROLA PART No. | IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R8 | 220KΩ | ½ | 6R6015 | BTS-220K | |
| R9 | 470KΩ | ½ | 6R6032 | BTS-470K | |
| R10 | 330Ω | 1 | 6R5254 | BTA-330 | |
| R11 | 3900Ω | 2 | 6R476012 | BTB-3900 | |
| R12 | 56Ω | ½ | 6R5614 | BTS-56 | |
| R13 | 56Ω | ½ | 6R5614 | BTS-56 | |

## TRANSFORMER (VIBRATOR)

| ITEM No. | RATING: PRI. | RATING: SEC. 1 | RATING: SEC. 2 | RATING: SEC. 3 | REPLACEMENT DATA: MOTOROLA PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. |
|---|---|---|---|---|---|---|---|---|---|
| T1 | 6.3VCT 2A | 350VCT .039A | | | 25C591533 | | | | |

# CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | IMPEDANCE | | DC RES. | | MOTOROLA PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. | |
| | PRI. | SEC. | PRI. | SEC. | | | | | | |
| T2 | 5.5KΩ | 3Ω | 600Ω | .65Ω | 25B502142 | A-3877 ① | A-2930 ① | RO-9 ① | S-3X ① | ① Drill one new mounting hole. |

## SPEAKER

| ITEM No. | RATINGS | | | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | MOTOROLA PART No. | VIKING PART No. | QUAM PART No. | |
| SP1 | 4 x 6" | PM | 3Ω | 50C501823 | 46J6 | 46A1 | |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. | | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | PRI. | SEC. | MOTOROLA PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | |
| L1 | Ant. Spark Choke | .05Ω | | 24K592197 | | | 4606 | 2.4 Microhenries |
| L2 | Ant. Coil | 4.6Ω | | 24B591628 | | | | |
| L3 | Osc. Coil | 8Ω | | 24A591629 | | | | Tapped @ .8Ω |
| L4 | Input IF | 20Ω | 20Ω | 24K591556 | 16-6758 | BC-352 | 12-C1 | |
| L5 | Output IF | 20Ω | 20Ω | 24K591555 | 16-6770 | BC-355 | 12-C6 | |
| L6 | Fil. Choke | 0Ω | | 24K510576 | | | | |
| L7 | Vibrator Hash Choke | .05Ω | | 24A472535 | | | 5221 | 15.2 Microhenries |

## VIBRATOR

| ITEM No. | TYPE | INPUT VOLTS | FREQUENCY | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | | | MOTOROLA PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | RADIART PART No. | |
| M1 | Int. | 6.3V. | 115∿ | 48B3333 | 5342 | 859 | 5342 | |

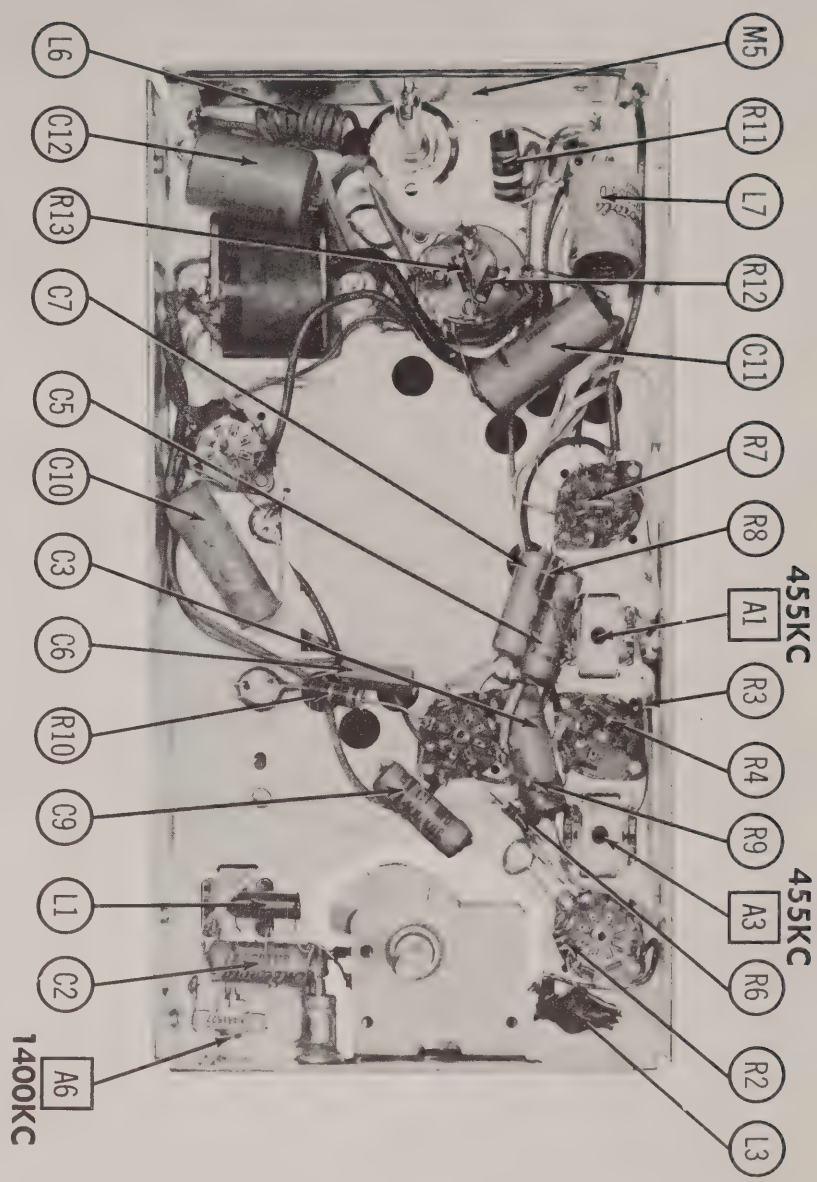
## FUSES

| ITEM No. | TYPE | RATING | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | MOTOROLA PART No. | | LITTELFUSE PART No. | | BUSS PART No. | |
| | | | FUSE | HOLDER | FUSE | HOLDER | FUSE | HOLDER |
| M2 | 3AG | 10A @ 32V | 65A10266 | 31A591516 | 311.010 | 357001 | AGC 10 | 4405 |

## MISCELLANEOUS

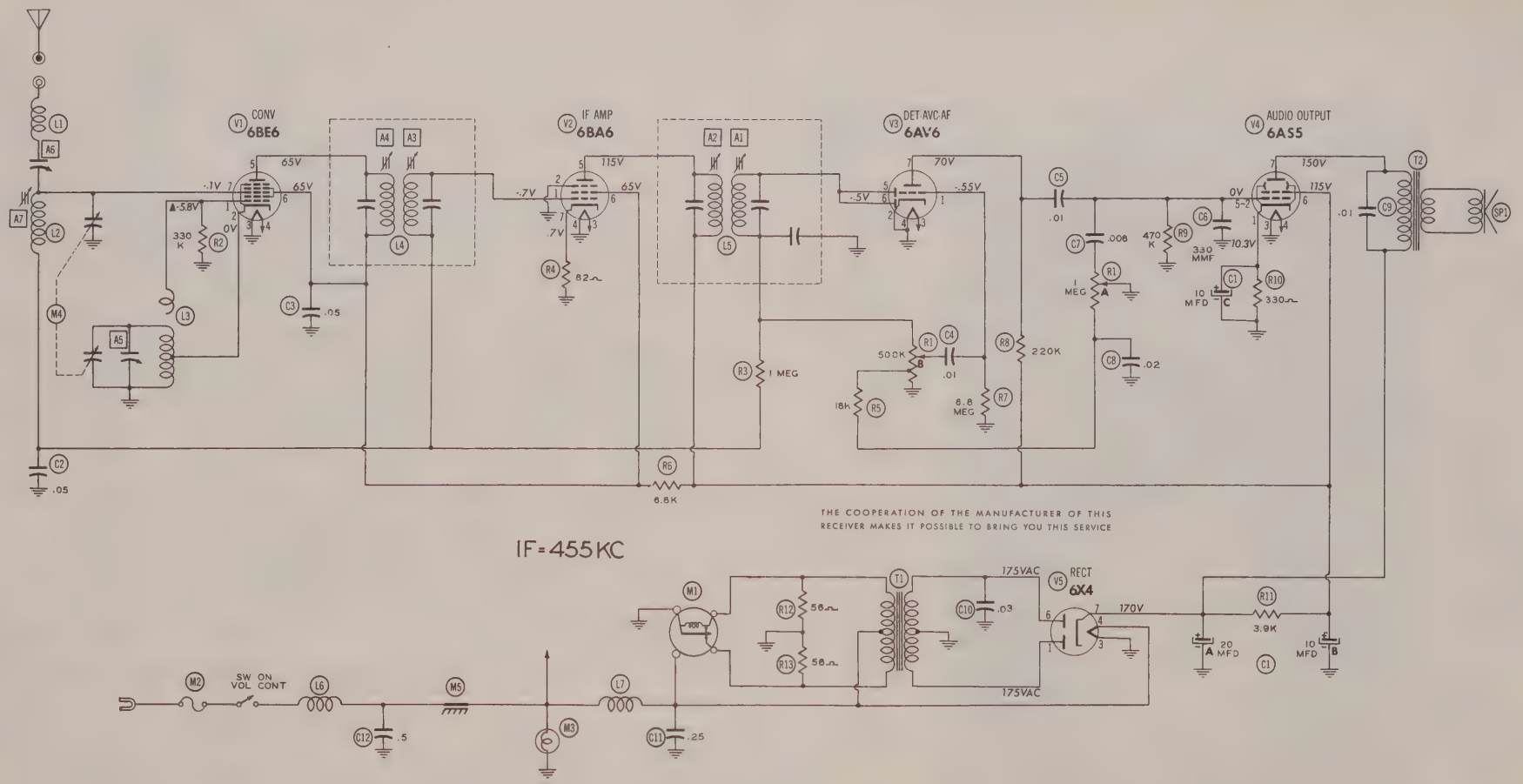
| ITEM No. | PART NAME | MOTOROLA PART No. | NOTES |
|---|---|---|---|
| M3 | Dial Light | 65X10867 | Bayonet Type #44 |
| M4 | Tuning Capacitor | 19B501790 | 18-452MMF, 11-155MMF |
| M5 | Spark Plate Assy. | 1A591512 | |
| A5 | Trimmer Cap. | 20K511186 | Osc. Trimmer |
| A6 | Trimmer Cap. | 20K481527 | Ant. Trimmer |
| | Cover Assy. (Front) | 1V521894 | Includes speaker, mounting bushing & pilot light socket |
| | Cover (rear) | 15D501838 | |
| | Pointer | 52A502203 | Dial |
| | Scale | 34C521897 | Dial |
| | Knob | 36B502202 | Tone |
| | Knob | 36B502200 | Tuning |
| | Knob | 36K502201 | Volume |

# CHASSIS—BOTTOM VIEW




SET 216 FOLDER 6

NASH MODEL NH3C




RESISTANCE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V 1 | 6BE6 | 33KΩ | .8Ω | 0Ω | .1Ω | †10.7KΩ | †10.7KΩ | ▫1.3Meg |
| V 2 | 6BA6 | ▫1.3Meg | 0Ω | .1Ω | 0Ω | †3.9KΩ | †10.7KΩ | 82Ω |
| V 3 | 6AV6 | 6.8Meg | 0Ω | .1Ω | 0Ω | ▫370KΩ | ▫370KΩ | †220KΩ |
| V 4 | 6AS5 | 330Ω | 470KΩ | 0Ω | .1Ω | 470KΩ | †3.9KΩ | †800Ω |
| V 5 | 6X4 | 366Ω | INF | .1Ω | 0Ω | INF | 407Ω | 200KΩ |

▲ TAKEN WITH VACUUM TUBE VOLTMETER
† MEASURED FROM PIN 7 OF V5.
▫ MEASURED WITH R1A IN EXTREME CLOCKWISE POSITION

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 6.3 Volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

# OLYMPIC MODELS 17C57, 17K55, 17T56 (Ch. TM-17)

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MODEL 17T56

/

OLYMPIC MODELS 17C57, 17K55, 17T56 (Ch. TM-17)

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OLYMPIC MODELS 17C57, 17K55, 17T56 (Ch. TM-17)

OLYMPIC MODEL 17T56

| | |
|---|---|
| TRADE NAME | Olympic Models 17C57, 17K55, 17T56 (Ch. TM-17) |
| MANUFACTURER | Olympic Radio & Television Inc., 34-01 38th. Ave., Long Island City 1, N.Y. |
| TYPE SET | Television Receiver |
| TUBES | Twenty |
| POWER SUPPLY | 110-120 Volts AC-60 Cycle |
| RATING | 1.56 Amp @ 117 Volts AC |
| TUNING RANGE | Channels 2 thru 13, Video 26.25MC, Sound IF 21.75MC (Intercarrier) |

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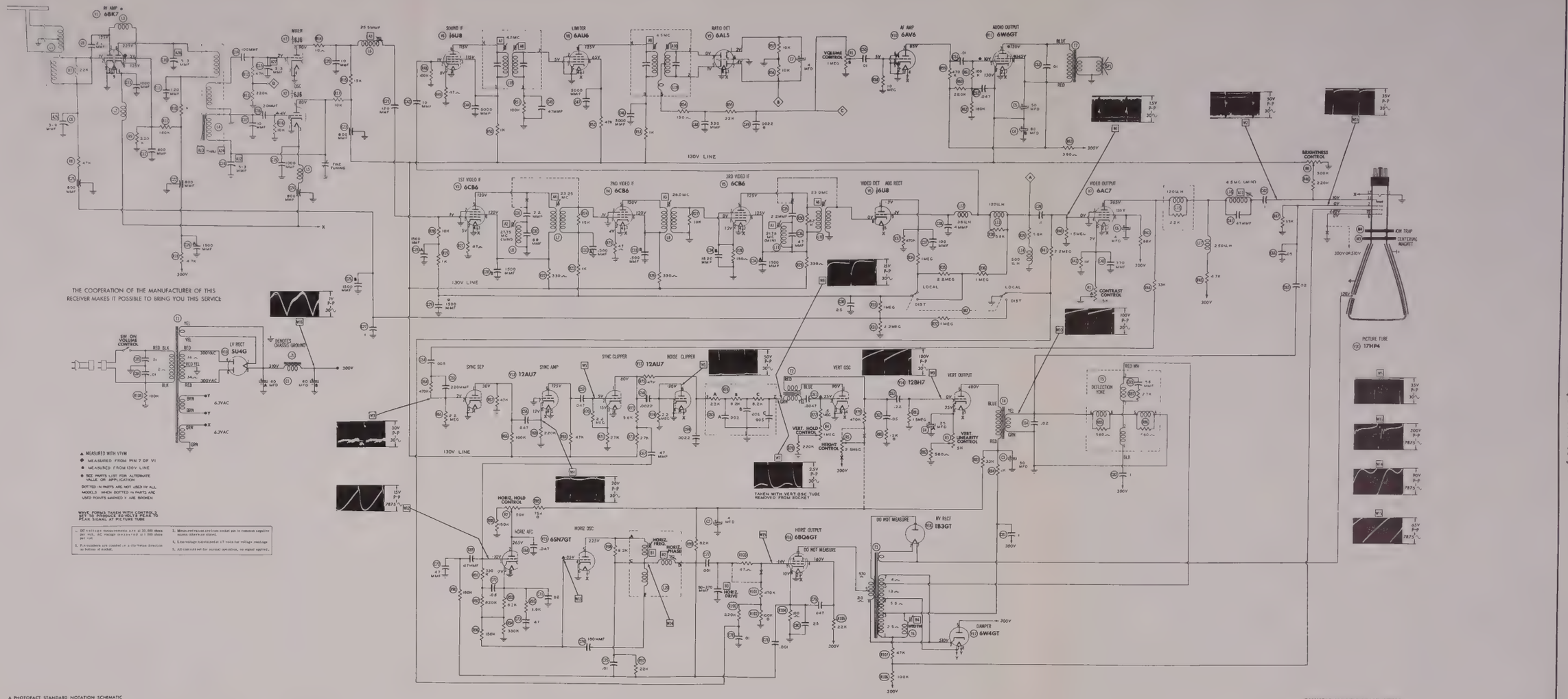
OLYMPIC MODELS
17C57, 17K55, 17T56 (Ch. TM-17)
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
▲ MEASURED WITH VTVM
● MEASURED FROM PIN 7 OF V1
■ MEASURED FROM 130V LINE
◆ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DOTTED -IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK TO PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements are at 20,000 ohms per volt, AC voltage measured at 1,000 ohms per volt.
2. P.C. numbers are counted in a clockwise direction as bottom of socket.
3. Measurements taken from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.
IF AMP
6BK7
MIXER
6J6
OSC
6J6
SOUND IF
6U8
LIMITER
6AU6
RATIO DET
6AL5
AV AMP
6AV6
AUDIO OUTPUT
6W6GT
1ST VIDEO IF
6CB6
2ND VIDEO IF
6CB6
3RD VIDEO IF
6CB6
VIDEO DET AGC RECT
6U8
VIDEO OUTPUT
6AC7
SYNC SEP
12AU7
SYNC AMP
SYNC CLIPPER
12AU7
NOISE CLIPPER
VERT OSC
12BH7
VERT OUTPUT
HORIZ AFC
6SN7GT
HORIZ OSC
HORIZ OUTPUT
6BQ6GT
HV RECT
1B3GT
DAMPER
6W4GT
PICTURE TUBE
17HP4
SW ON VOLUME CONTROL
LV RECT
5U4G
130V LINE
300V
BRIGHTNESS CONTROL
CONTRAST CONTROL
ION TRAP CENTERING MAGNET
DEFLECTION YOKE
VERT LINEARITY CONTROL
VERT. HOLD CONTROL
HEIGHT CONTROL
HORIZ. HOLD CONTROL
HORIZ. FREQ.
HORIZ. PHASE
HORIZ. DRIVE
WIDTH
DO NOT MEASURE
TAKEN WITH VERT OSC TUBE REMOVED FROM SOCKET
LOCAL
DIST
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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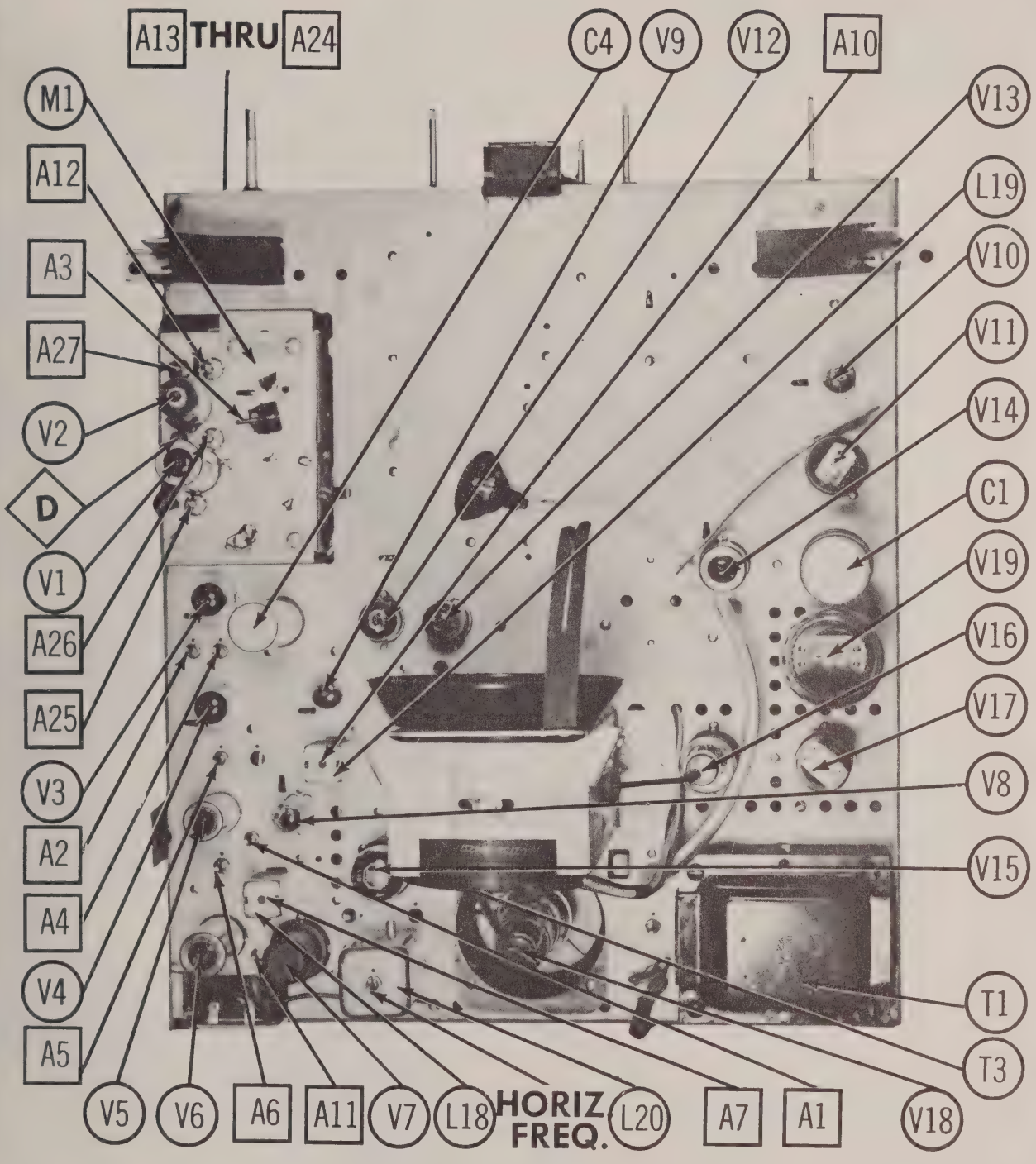
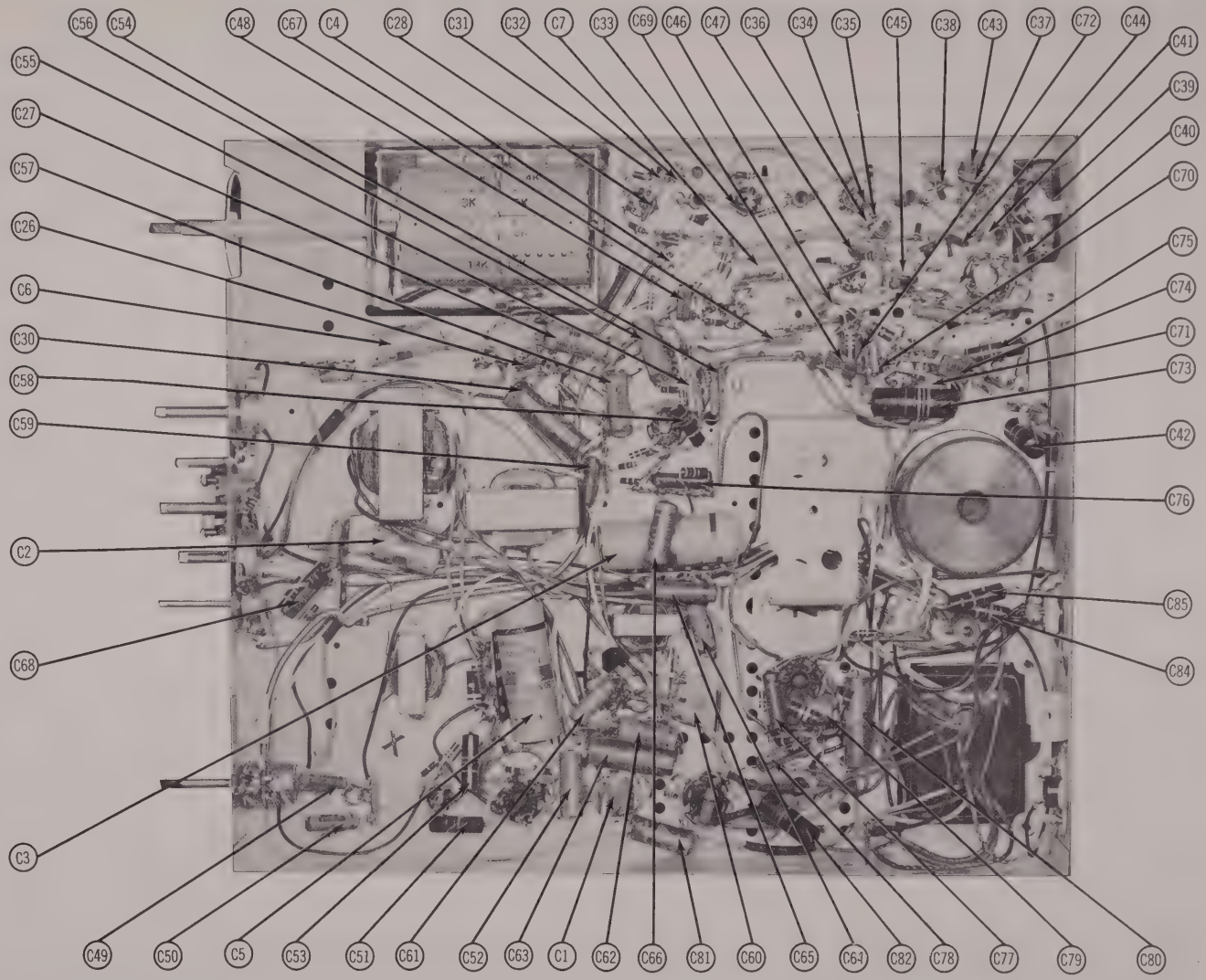
OLYMPIC MODELS 17C57, 17K55, 17T56 (Ch. TM-17)



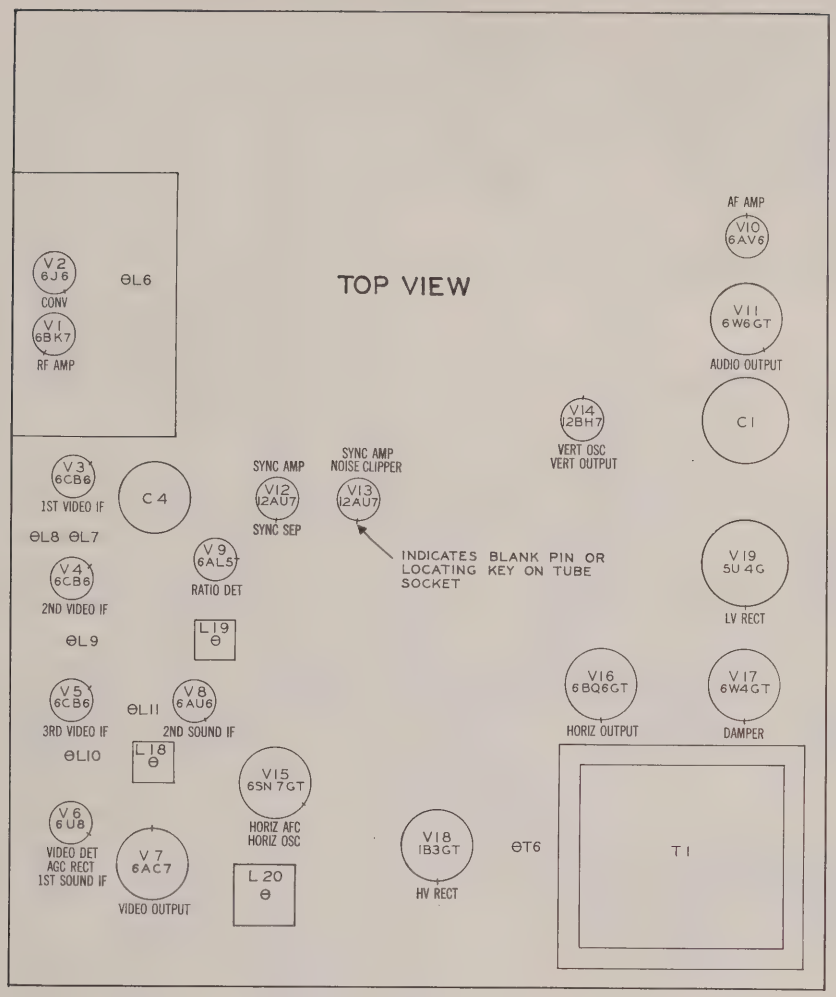

CHASSIS TOP VIEW




CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

L. F. BLANKENSHIP
3934 MEADE ST.
DENVER, COLO. 80

# TUBE PLACEMENT CHART




3924 MEADE ST.
DENVER, COLORADO



# TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V19**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6, V11**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V7, V20**
Has pic, no sound - **V6, V8, V9, V10, V11**

SYNC FAILURE
No vert. sync - **V13, V14**
No horiz. sync - **V13, V15**
No vert. or horiz. sync - **V12, V13**

SWEEP FAILURE
No raster, has sound - **V15, V16, V17, V18, V20**
No vertical deflection - **V14**
Poor vert. linearity or foldover - **V14**
Poor horiz. linearity or foldover - **V15, V16, V17**
Narrow picture - **V15, V16, V17, V18, V19**
Vert. off freq. - **V13, V14**
Horiz. off freq. - **V13, V15**

# ALIGNMENT INSTRUCTIONS

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**

**The high voltage shock hazard can be eliminated by removing the horizontal oscillator tube, V15.**

## VIDEO IF ALIGNMENT

Remove the converter tube from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | Direct | High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis. | 21.75MC (Unmod) | Any | DC probe thru 100KΩ to point (A) Common to chassis. | A1 | Adjust for MINIMUM deflection. |
| 2. | " | " | 27.75MC | " | " | A2 | " |
| 3. | " | " | 25.5MC | " | " | A3 | Adjust for maximum deflection. (If oscillation occurs during alignment set A4 counter clockwise until screw projects approximately 3/4 inch. Then adjust A3, A5 and A6 to the proper frequencies and continue with adjustment of A4 for maximum at 23.25MC). |
| 4. | " | " | 23.25MC | " | " | A4 | Adjust for maximum deflection. |
| 5. | " | " | 26.0MC | " | " | A5 | " |
| 6. | " | " | 23.0MC | " | " | A6 | " |

## OVERALL VIDEO IF RESPONSE CHECK

Connect the negative lead of a 1.5 volt battery to the ungrounded side of C30. Connect the positive lead to chassis.
Set the Local-Distance switch to local position.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 7. | Direct | High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis. | 24MC (10MC Swp) | 21.75MC<br>23.5MC<br>26.25MC<br>27.75MC | Any | Vert. amp to point (A) Low side to chassis. | | Check for response similar to Fig. 1. If necessary retouch A4 thru A6 for desired response. |

## SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 8. | .01MFD | High side to point (A) Low side to chassis. | 4.5MC (Unmod) | Any | DC probe to point (B) Common to chassis. | A7, A8 A9 | Adjust for maximum deflection. |
| 9. | " | " | " | " | DC probe to point (C) Common to chassis. | A10 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

## SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 8. | .01MFD | High side to point (A) Low side to chassis. | 4.5MC (450KC Swp) | 4.5MC | Any | Vert. Amp. to point (B). Low side to chassis. | A7, A8, A9 | Disconnect stabilizer capacitor C7. Ajust for curve of maximum amplitude and symmetry as in Fig. 2. |
| 9. | " | " | " | " | " | Vert. Amp. to point (C). Low side to chassis. | A10 | Reconnect capacitor C7. Adjust so that 4.5 MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines. |

## 4.5MC TRAP ALIGNMENT

Set contrast control to maximum.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 10. | .01MFD | High side to point (A) Low side to chassis. | 4.5MC (Unmod) | Any | DC probe thru detector to pin 11 of picture tube. Common to chassis. | A11 | Remove 6CB6 (V9) from its socket while adjusting A11. Adjust for MINIMUM deflection. |

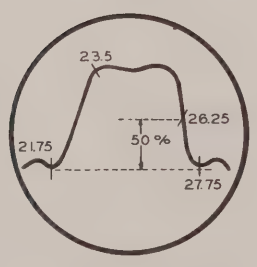


FIG. 1

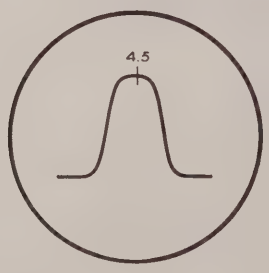


FIG. 2

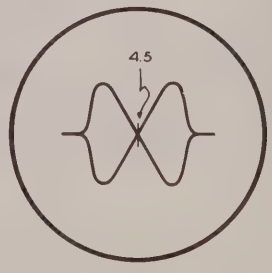


FIG. 3

# ALIGNMENT INSTRUCTIONS (CONT.)

## OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A12. It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct any individual channel.
If adjustment of A12 will not bring all channel well within the range of the fine tuning control it will be necessary to adjust the channel strip adjustment for each channel that is off frequency. The channel adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 11. | Two 120Ω Carbon Resistors | Across antenna terminals with 120Ω in each lead. | 213MC (10MC Swp) | 211.25MC 215.75MC | 13 | Vert. Amp. to point (A). Low side to chassis. | A13 | Adjust to place sound marker in notch as in Fig. 5. Video marker should be at 50%. |
| | | | 207MC (10MC Swp) | 205.25MC 209.75MC | 12 | | A14 | |
| | | | 201MC (10MC Swp) | 199.25MC 203.75MC | 11 | | A15 | |
| | | | 195MC (10MC Swp) | 193.25MC 197.75MC | 10 | | A16 | |
| | | | 189MC (10MC Swp) | 187.25MC 191.75MC | 9 | | A17 | |
| | | | 183MC (10MC Swp) | 181.25MC 185.75MC | 8 | | A18 | |
| | | | 177MC (10MC Swp) | 175.25MC 179.75MC | 7 | | A19 | |
| | | | 85MC (10MC Swp) | 83.25MC 87.75MC | 6 | | A20 | |
| | | | 79MC (10MC Swp) | 77.25MC 81.75MC | 5 | | A21 | |
| | | | 69MC (10MC Swp) | 67.25MC 71.75MC | 4 | | A22 | |
| | | | 63MC (10MC Swp) | 61.25MC 65.75MC | 3 | | A23 | |
| | | | 57MC (10MC Swp) | 55.25MC 59.75MC | 2 | | A24 | |

## RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 12. | Two 120Ω Carbon Resistors | Across antenna terminals with 120Ω in each lead. | 207MC (10MC Swp) | 205.25MC 209.75MC | 12 | Vert. Amp. thru 10KΩ to point (D). Low side to chassis. | A25, A26, A27 | Adjust for response curve similar to Fig. 6. |
| 13. | " | " | 213MC (10MC Swp) | 211.25MC 215.75MC | 13 | " | | Check for response similar to Fig. 6. If markers fall below 70% on any channel make slight compromise adjustments of A25, A26 and A27 with channel switch set to that channel, then recheck all other channels to see that they have not been seriously affected. |
| | | | 201MC (10MC Swp) | 199.25MC 203.75MC | 11 | | | |
| | | | 195MC (10MC Swp) | 193.25MC 197.75MC | 10 | | | |
| | | | 189MC (10MC Swp) | 187.25MC 191.75MC | 9 | | | |
| | | | 183MC (10MC Swp) | 181.25MC 185.75MC | 8 | | | |
| | | | 177MC (10MC Swp) | 175.25MC 179.75MC | 7 | | | |
| | | | 85MC (10MC Swp) | 83.25MC 87.75MC | 6 | | | |
| | | | 79MC (10MC Swp) | 77.25MC 81.75MC | 5 | | | |
| | | | 69MC (10MC Swp) | 67.25MC 71.75MC | 4 | | | |
| | | | 63MC (10MC Swp) | 61.25MC 65.75MC | 3 | | | |
| | | | 57MC (10MC Swp) | 55.25MC 59.75MC | 2 | | | |

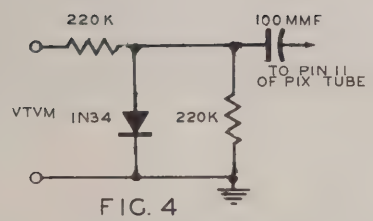


FIG. 4

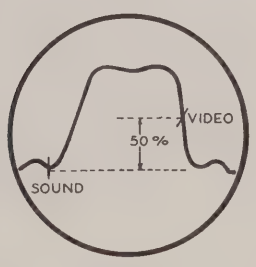


FIG. 5

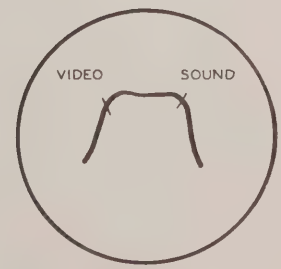
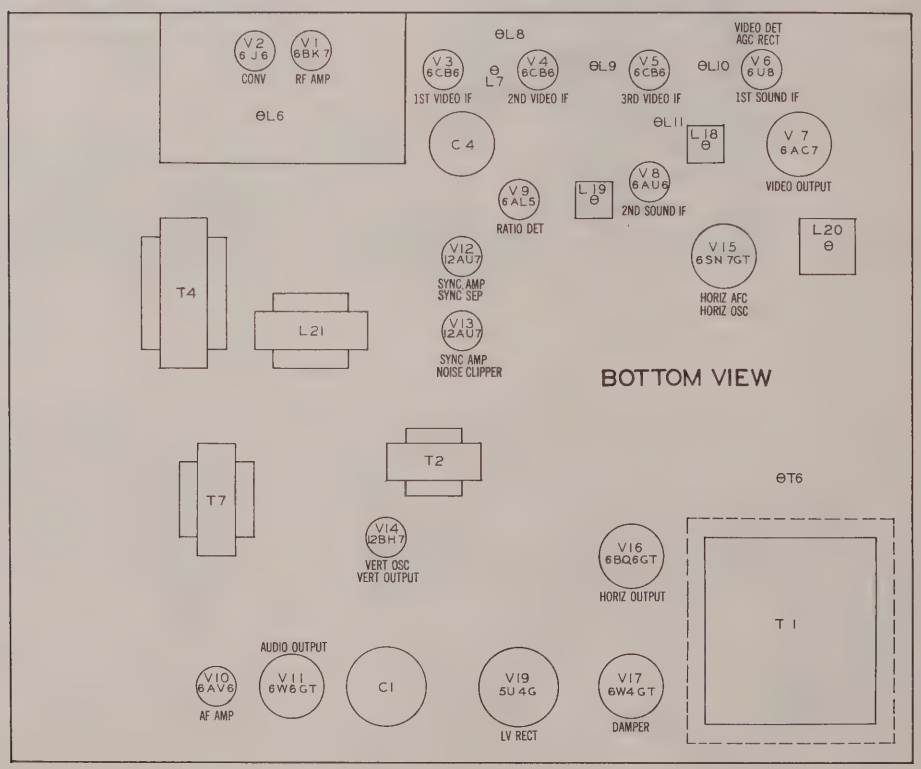


FIG. 6

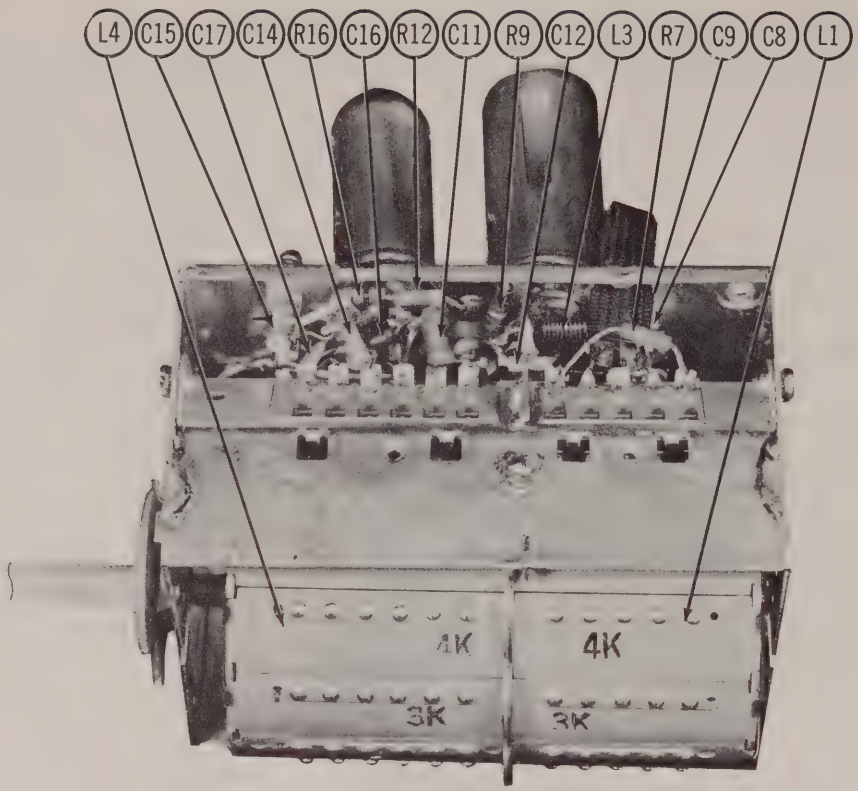
# RESISTANCE MEASUREMENTS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 6BK7 | 1NF | 800KΩ | 0Ω | .1Ω | 0Ω | †5.7KΩ | 115KΩ | INF | 0Ω |
| V 2 | 6J6 | ♯10KΩ | ♯15KΩ | .1Ω | 0Ω | 225KΩ | 10KΩ | 0Ω | | |
| V 3 | 6CB6 | 760KΩ | 47Ω | .1Ω | 0Ω | ♯330Ω | ♯330Ω | 0Ω | | |
| V 4 | 6CB6 | 760KΩ | 47Ω | .1Ω | 0Ω | ♯330Ω | ♯330Ω | 0Ω | | |
| V 5 | 6CB6 | .2Ω | 150Ω | .1Ω | 0Ω | †394Ω | †394Ω | 150Ω | | |
| V 6 | 6U8 | 470KΩ | 100KΩ | ♯1KΩ | 0Ω | .1Ω | ♯1KΩ | 47Ω | .2Ω | 5.6KΩ |
| V 7 | 6AC7 | 0Ω | 0Ω | 0Ω | 890KΩ | 150Ω | †68KΩ | .1Ω | †4.7KΩ | |
| V 8 | 6AU6 | 100KΩ | 0Ω | .1Ω | 0Ω | ♯1KΩ | ♯47KΩ | 0Ω | | |
| V 9 | 6AL5 | 10KΩ | 10KΩ | .1Ω | 0Ω | 1 Meg | 0Ω | 1 Meg | | |
| V 10 | 6AV6 | 10Meg | 0Ω | 0Ω | .1Ω | 0Ω | 0Ω | 470KΩ | | |
| V 11 | 6W6GT | 0Ω | 0Ω | †2.7KΩ | †454Ω | 180KΩ | 110KΩ | .1Ω | 70KΩ | |
| V 12 | 12AU7 | ♯47KΩ | 2.2Meg | 0Ω | 0Ω | 0Ω | ♯47KΩ | 0Ω | 220KΩ | .1Ω |
| V 13 | 12AU7 | ♯8.5KΩ | 2.2Meg | 2.7KΩ | 0Ω | 0Ω | 2.2Meg | 2.2Meg | 0Ω | .1Ω |
| V 14 | 12BH7 | †575KΩ | 2.4Meg | 0Ω | .1Ω | .1Ω | ▲2.6KΩ | 1.5Meg | 2.2KΩ | 0Ω |
| V 15 | 6SN7GT | 1.5Meg | ▲90KΩ | 370KΩ | 480KΩ | ▲125KΩ | 0Ω | .1Ω | 0Ω | |
| V 16 | 6BQ6GT | INF | 0Ω | INF | †22KΩ | 540KΩ | 540KΩ | .1Ω | 100Ω | Top Cap ▲20Ω |
| V 17 | 6W4GT | INF | INF | 75KΩ | INF | †64Ω | INF | ▲17Ω | ▲17Ω | |
| V 18 | 1B3GT | PINS 1 - 8 HAVE INF RESISTANCE | | | | | | | | Top Cap ▲590Ω |
| V 19 | 5U4G | INF | 62KΩ | ▲25Ω | 36Ω | INF | 33Ω | ▲1000Ω | 62KΩ | |
| V 20 | 17HP4 | 0Ω | 33KΩ | Pin 6 0Ω | Pin 10 ▲47KΩ | Pin 11 270KΩ | Pin 12 .1Ω | | | |

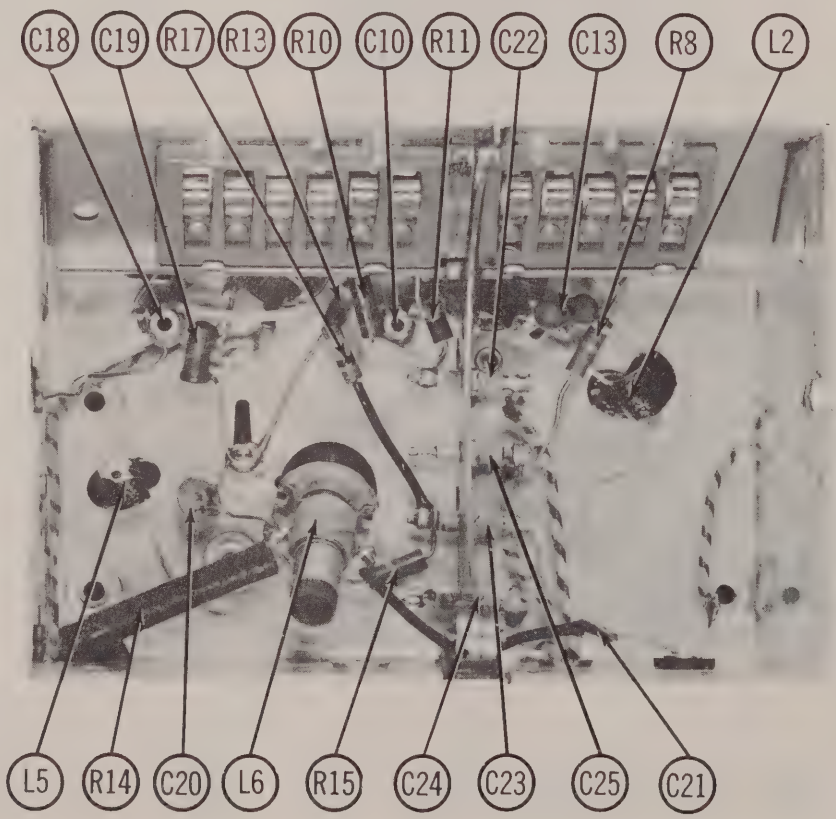
ALL MEASUREMENTS IN LOCAL POSITION
♯ MEASURED FROM 130V LINE
† MEASURED FROM PIN 8 OF V19.
▲ MEASURED FROM PIN 3 OF V17.



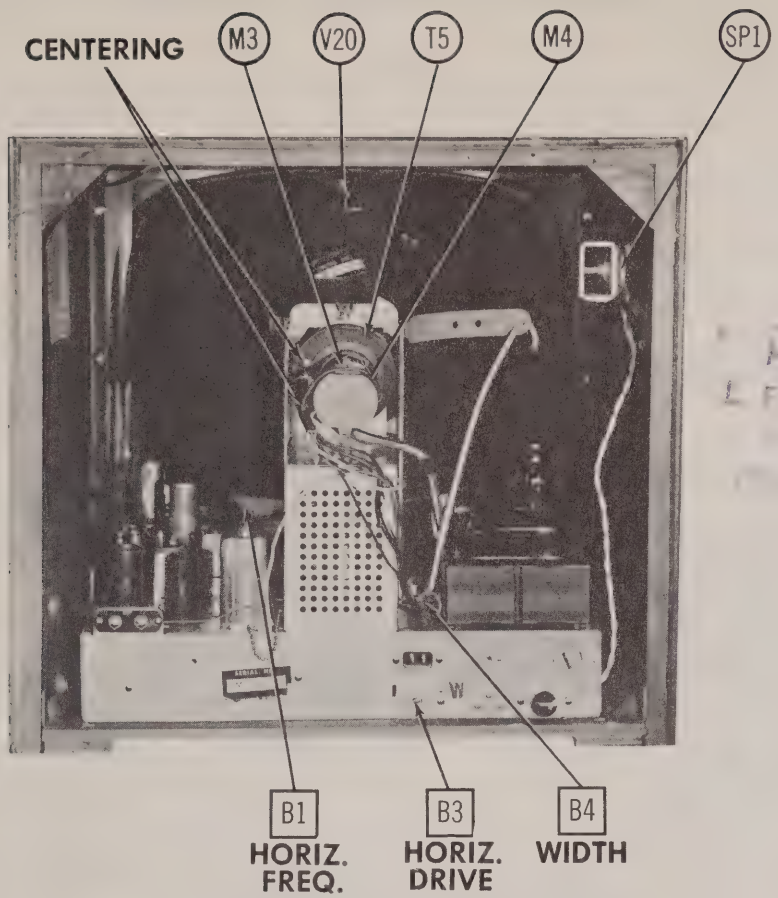

# TUBE PLACEMENT CHART




RF TUNER-RIGHT SIDE




RF TUNER-BOTTOM VIEW




CABINET–REAR VIEW

PROPERTY OF
L. F. BLA[illegible]SHIP



## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Connect a short from terminal C to terminal D of the horizontal oscillator coil L20.

Set the horizontal hold control to fully clockwise position.

Adjust the horizontal frequency slug (B1) until the picture falls into sync.

Remove the short from the horizontal oscillator coil and connect the vertical amplifier input of an oscilloscope thru a 5MMF capacitor to terminal C of the coil.

Adjust the horizontal phasing slug (B2) for a waveshape on scope as in Fig. 7 with broad and narrow peaks of equal height.

If necessary, during adjustment of B2 keep the picture in sync with B1 or the horizontal hold.

Remove the scope from terminal C of L20 and retouch B1 for the following conditions:

1. At full clockwise position of the horizontal hold control a blanking bar or picture jitter should be evident.
2. At full counter clockwise position the picture should be out of sync, with 4½ to 5 bars sloping down to the left.

It may be necessary to momentarily interrupt the signal to throw the picture out of sync.

Adjust the horizontal drive trimmer (B3) counter clockwise as far as possible without the presence of vertical white bars or compression of the picture. If neither of these indications appear set B3 2 turns counter clockwise from tight.

Adjust the width slug (B4) for a picture slightly wider than necessary to fill the picture mask horizontally.

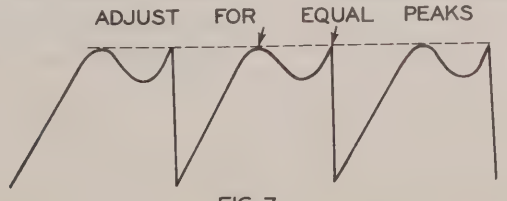



FIG. 7

# TROUBLE SHOOTING AIDS

## SWEEP

### HORIZONTAL

**LOSS OF SWEEP**

Follow procedure outlined under "Loss of High Voltage".

**INSUFFICIENT SWEEP**

Check by substitution V15, V16, V17 and V19. Check amplitude of waveform W15.

| If Insufficient | If Sufficient |
|---|---|
| Check all components of horizontal oscillator. Check components of coupling and waveshaping network between V15 and V16. Check B+ circuit. | Check all components of horizontal output stage. Check T3 and T5A. Check components of damper circuit. |

**DRIVE LINES**

Substitute V16. Check drive control and coupling network between V15 and V16.

**COMPRESSED AT LEFT SIDE**

Substitute V17 and check T5A. Check damper circuit components.

**FOLDS**

Substitute V16 and V17. Check associated components.

**XMAS TREE EFFECT**

Substitute V15 and check components, particularly, L20, C67, C69, C74 and C75.

### VERTICAL

**LOSS OF SWEEP**

Substitute V14. Check waveform W9.

| If Unsatisfactory | If Satisfactory |
|---|---|
| Check T2, C61, C63, R77, R78, R79 and R81. | Check T4 and T5B. Check C3 and R84. |

**INSUFFICIENT SWEEP**

Follow procedure outlined under "Loss of Sweep".

**COMPRESSED AT BOTTOM**

Substitute V14. Check C4A, C62, R80 and R81.

**COMPRESSED AT TOP**

Substitute V14 and check associated components.

**FOLDS**

Check C62 and R80 for open.

## SYNC

### HORIZONTAL

**LOSS OF SYNC**

Substitute V12, V13 and V15. Check waveform W13.

| If Unsatisfactory | If Satisfactory |
|---|---|
| Check waveform W12. | Check all components of horizontal oscillator, especially L20, C67, C69, C74 and C75. |

Check waveform W12.

| If Unsatisfactory | If Satisfactory |
|---|---|
| Check all components of V12 and V13. Check coupling network between V13 and V15. | Check all components of the horizontal AFC circuit. |

**CRITICAL SYNC**

If substituting V12, V13 and V15 fails to correct trouble, follow procedure outlined under "Loss of Sync".

**PULLING PICTURE**

Substitute V15. Check adjustment of L20 following procedure outlined in alignment section. Check all components of V15.

### VERTICAL

**LOSS OF SYNC**

Check by substitution V12, V13 and V14. Check waveform W7.

| If Unsatisfactory | If Satisfactory |
|---|---|
| Check all components of V12 and V13. Check integrator circuit. | Check all components of V14, especially T2 and C61. |

**CRITICAL SYNC**

If substitution of V12, V13 and V14 does not correct trouble, follow procedure outlined under "Loss of Sync".

**TRIGGERING**

Dress filament leads away from vertical oscillator grid leads.

## VIDEO

**LOSS OF VIDEO**

Substitute V7 and check associated components. Check picture tube.

**SOUND BARS**

Check adjustment of A-11 (4.5MC Trap). Check setting of local oscillator and alignment of IF stages.

**POOR RESOLUTION**

Substitute V7. Check associated components. Check alignment of tuner and video IF stages.

**POOR CONTRAST**

Check waveform W2.

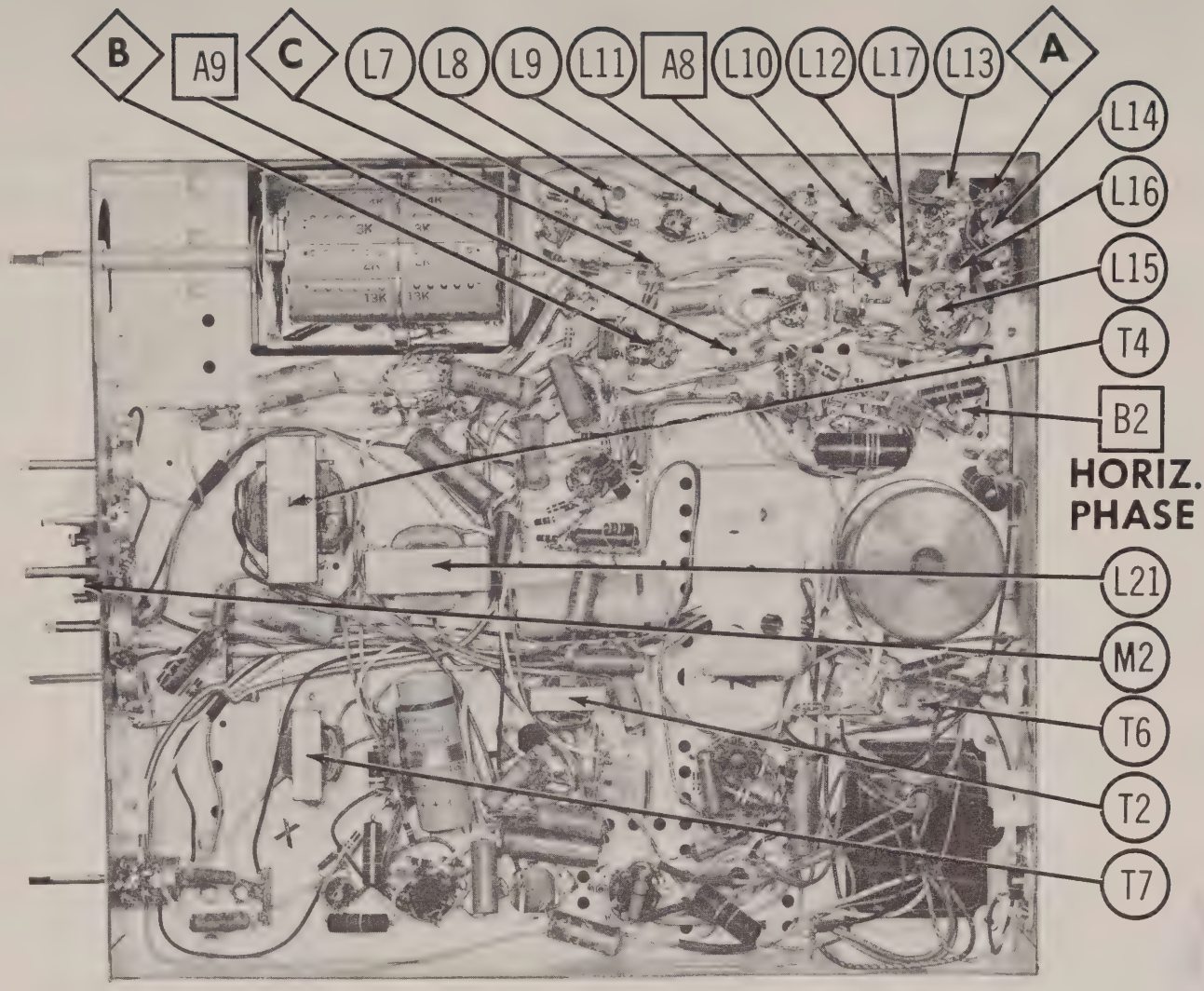
| If Unsatisfactory | If Satisfactory |
|---|---|
| Substitute V3, V4, V5 and V7. Check associated components. | Check picture tube and components. |

**SMEAR**

Substitute V7 and check circuit components.

**ONE BLACK BAR ACROSS PICTURE ACCOMPANIED BY PULLING EFFECT**

Check tuner, video IF and video amplifier tubes for filament to cathode leakage.




CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

## TUBES (SYLVANIA, GENERAL ELECTRIC or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA: OLYMPIC PART No. | REPLACEMENT DATA: STANDARD REPLACEMENT | RTMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| V1A | RF Amplifier | 6BK7 | 6BK7 | 9AJ | |
| B | RF Amplifier | 6BQ7 | 6BQ7 | 9AJ | |
| V2 | Converter | 6J6 | 6J6 | 7BF | |
| V3 | 1st. Video IF Amp. | 6CB6 | 6CB6 | 7CM | |
| V4 | 2nd. Video IF Amp | 6CB6 | 6CB6 | 7CM | |
| V5 | 3rd. Video IF Amp | 6CB6 | 6CB6 | 7CM | |
| V6 | Video Detector - AGC Rectifier - 1st. Sound IF Amp. | 6U8 | 6U8 | 9AE | |
| V7 | Video Output | 6AC7 | 6AC7 | 8N | |
| V8 | 2nd. Sound IF Amp | 6AU6 | 6AU6 | 7BK | |
| V9 | Ratio Detector | 6AL5 | 6AL5 | 6BT | |
| V10 | AF Amplifier | 6AV6 | 6AV6 | 7BT | |
| V11 | Audio Output | 6W6GT | 6W6GT | 7B | |
| V12 | Sync Amplifier - Sync Seperator | 12AU7 | 12AU7 | 9A | |
| V13 | Sync Amplifier - Noise Clipper | 12AU7 | 12AU7 | 9A | |
| V14 | Vert. Oscillator - Vert. Output | 12BH7 | 12BH7 | 9A | |
| V15 | Horiz. AFC - Horiz. Oscillator | 6SN7GT | 6SN7GT | 8BD | |
| V16 | Horiz. Output | 6BQ6GT | 6BQ6GT | 6AM | |
| V17 | Damper | 5W4GT | 5W4GT | 4CG | |
| V18 | HV Rectifier | 1B3GT | 1B3GT | 3C | |
| V19 | LV Rectifier | 5U4G | 5U4G | 5T | |

## CATHODE-RAY TUBE

| ITEM No. | REPLACEMENT DATA: OLYMPIC PART No. | SYLVANIA PART No. | GENERAL ELECTRIC PART No. | RTMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| V20 | 17HP4 | 17HP4<br>17RP4 | 17HP4 | 13C<br>13C | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING: CAP. | RATING: VOLT | REPLACEMENT DATA: OLYMPIC PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C1A | ▲80 | 450 | CO-2758 | AFH3-46 | | BO46 | | FF447 | R1276 | |
| B | ▲60 | 450 | | | | BR4045A | | | | |
| C2 | 4 | 450 | CO-1056 | PR8450/4 | | BR445 | | TC70 | TVA-1702 | |
| C3 | 50 | 350 | CO-2344 | | | | | | | |
| C4A | ▲125 | 25 | CO-2759 | AFH3-89 | | A030 | | | R1275 | |
| B | ▲60 | 200 | | PR825/100 | | BR8258A | | | | |
| C5 | 50 | 350 | CO-2344 | PR8450/50 | | BR5035 | TC88 | | TVA-1713 | |
| C6 | 4 | 450 | CO-1056 | PR8450/4 | | BR445 | TC70 | | TVA-1702 | |
| C7 | 4 | 50 | CO-2756 | PR8150/4 | | BR415 | TC30 | | TVA-1402 | |
| C8 | 3-9 | | | | 829-10 | | | | | |
| C9 | 2.2 | | | S12.2NP0 | TCZ-2.2 | | NP0K-2R2 | | 5TCCB-V22 | |
| C10 | .5-3 | | | | 829-3 | | CT585A | | | |
| C11 | 120 | | | S1120 | D6-121 | TM5T12 | GP2K-121 | UC-5312 | 5GA-T12 | |
| C12 | 800 | | | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C13 | 1000 | | | S1000 | D6-102 | TM5D1 | GP2L-102 | UC-531 | 5HK-D1 | |
| C14 | 100 | | | S100 | D6-101 | TM5T1 | GP1K-101 | UC-531 | 5GA-T1 | |
| C15 | .5-3 | | | | 829-3 | | CT585A | | | |
| C16 | 20 | | | S120NP0 | TCZ-20 | | NP0K-200 | ST-543 | 5TCC-Q2 | |
| C17 | 10 | | | S110N750 | TCN-10 | | N750K-100 | NT-541 | 5TCU-Q1 | |
| C18 | .5-3 | | | | 829-3 | | CT585A | | | |
| C19 | 1000 | | | S1000 | D6-102 | TM5D1 | GP2L-102 | UC-531 | 5HK-D1 | |
| C20 | 10 | | | S10NP0 | TCZ-10 | | NP0K-100 | ZT-541 | 5TCC-Q1 | |
| C21 | 120 | | | BPD-00012 | D6-121 | TM5T12 | GP2K-121 | UC-5312 | 5GA-T12 | |
| C22 | 800 | | | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C23 | 800 | | | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C24 | 800 | | | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C25 | 800 | | | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C26A | 1500 | | CC2D-152K | BPD-2X0015 | DD-2-152 | TM5DD15 | 81Z-0015 | DCD-5215 | 5HK-2D15 | |
| B | 1500 | | | | | | | | | |
| C27 | .1 | 400 | CO-H-4104 | | | | | | | |
| C28A | 1500 | | CC2D-152K | BPD-2X0015 | DD-2-152 | TM5DD15 | 81Z-0015 | DCD-5215 | 5HK-2D15 | |
| B | 1500 | | | | | | | | | |
| C29 | 1500 | | | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | Note 1 |
| C30 | .25 | 400 | CO-H-4254 | P4S8-25 | | PTE4P25 | | PT4025 | 4TM-P25 | |
| C31 | 3.2 | | CO-1112 | S12.2NP0 | TCZ-3.2 | | NP0K-2R2 | | 5TCCB-V22 | |
| C32 | 68 | | | | | | | | | |
| C33A | 1500 | | CC2D-152K | BPD-2X0015 | DD-2-152 | TM5DD15 | 81Z-0015 | DCD-5215 | 5HK-2D15 | |
| B | 1500 | | | | | | | | | |
| C34A | 1500 | | CC2D-152K | BPD-2X0015 | DD-2-152 | TM5DD15 | 81Z-0015 | DCD-5215 | 5HK-2D15 | |
| B | 1500 | | | | | | | | | |
| C35 | 2.2 | | CO-1112 | S12.2NP0 | TCZ-2.2 | | NP0K-2R2 | | 5TCCB-V22 | |
| C36 | 47 | | | | | | | | | |
| C37 | 100 | 500 | RCM-20A-101M | 1468-0001 | D6-101 | 5W5T1 | GP1K-101 | MC335 | 1FM-31 | |
| C38 | 4 | 1500 | CO-1015 | | | | | | | |
| C39 | .1 | 400 | CO-H-4104 | P4S8-1 | DF-104 | PTE4P1 | | PT401 | 4TM-P1 | |
| C40 | 330 | 500 | RCM-20A-331M | 1469-00035 | | | | | | |
| C41 | 47 | | | 1469-0005 | | 5R5Q5 | | MCB225 | MS-45 | |
| C42 | .1 | 400 | CO-H-4104 | P4S8-1 | DF-104 | PTE4P1 | | PT401 | 4TM-P1 | |
| C43 | 10 | 500 | RCM-20A-100M | 1468-0001 | D6-100 | 5W5Q | GP1K-100 | MC315 | 1FM-41 | |
| C44 | 5000 | | CCD-502X | BPD-005 | MD-502 | TM5D5 | 81L-005 | DC-525 | 5HK-D5 | |
| C45 | 47 | 500 | RCM-20A-470M | 1468-00005 | D6-470 | 5W5Q5 | GP1K-470 | MC225 | 1FM-47 | |
| C46 | 5000 | | CCD-502X | BPD-005 | MD-502 | TM5D5 | 81L-005 | DC-525 | 5HK-D5 | |
| C47 | 5000 | | CCD-502X | BPD-005 | MD-502 | TM5D5 | 81L-005 | DC-525 | 5HK-D5 | |
| C48 | 330 | 500 | RCM-20A-331M | 1468-00035 | | | | | | |
| C49 | .0022 | 600 | CO-H-4222 | P4S8-0022 | D6-222 | PTE6D22 | GP2-333-222 | PT6222 | 6TM-D22 | Note 2 |
| C50 | .01 | 600 | CO-H-6103 | P6S8-01 | D6-103 | PTE6S1 | GP2-333-103 | PT611 | 6TM-S1 | |
| C51 | .01 | 600 | CO-H-6103 | P6S8-01 | D6-103 | PTE6S1 | GP2-333-103 | PT611 | 6TM-S1 | |
| C52 | .047 | 600 | CO-H-4503 | P4S8-047 | DF-503 | PTE4S47 | | PT147 | 4TM-S47 | |
| C53 | .01 | 600 | CO-H-6103 | P6S8-01 | D6-103 | PTE6S1 | GP2-333-103 | PT611 | 6TM-S1 | |
| C54 | .005 | 600 | CO-H-6502 | P6S8-005 | D6-502 | PTE6D5 | GP2-333-502 | PT625 | 6TM-D5 | |
| C55 | 220 | 500 | RCM-20A-221M | 1468-00025 | D6-221 | 5W5T25 | GP2K-221 | MC340 | 1FM-225 | |
| C56 | .047 | 400 | CO-H-4503 | P4S8-047 | DF-503 | PTE4S47 | | PT4147 | 4TM-S47 | |
| C57 | .047 | 400 | CO-H-4503 | P4S8-047 | DF-503 | PTE4S47 | | PT4147 | 4TM-S47 | |



# PARTS LIST AND DESCRIPTIONS

## CAPACITORS (CONT.)

| ITEM No. | RATING: CAP. | RATING: VOLT | REPLACEMENT DATA: OLYMPIC PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C58 | .0022 | 600 | CO-H-6202 | P6S8-0022 | D6-222 | PTE6D22 | GP2-333-222 | PT6222 | 6TM-D22 | |
| C59 | .0022 | 600 | CO-H-6202 | P6S8-0022 | D6-222 | PTE6D22 | GP2-333-222 | PT6222 | 6TM-D22 | |
| C60A | .002 | | | P6S8-002 | | PTE6D2 | | PT622 | | |
| B | .005 | | | P6S8-005 | *PC-100 | PTE6D5 | *1405-01 | PT625 | *101C1 | |
| C | .005 | | | P6S8-005 | | PTE6D5 | | PT625 | | |
| C61 | .0047 | 600 | CO-O-6472K | 1464-005 | | 1R5D5 | | MCB465 | MS-25 | |
| C62 | .05 | 400 | CO-H-4503 | P4S8-05 | DF-503 | PTE4S5 | | PT415 | 4TM-S5 | |
| C63 | .22 | 400 | CO-H-4254 | P4S8-22 | | PTE4P22 | | PT4025 | 4TM-P322 | |
| C64 | .02 | 400 | CO-H-4203 | P4S8-02 | DF-203 | PTE4S2 | | PT412 | 4TM-S2 | |
| C65 | .02 | 400 | CO-H-4203 | P4S8-02 | DF-203 | PTE4S2 | | PT412 | 4TM-S2 | |
| C66 | .05 | 400 | CO-H-4503 | P4S8-05 | DF-503 | PTE4S5 | | PT415 | 4TM-S5 | |
| C67 | 47 | 500 | RCM-20C-470K | 1469-00005 | | 5R5Q5 | | MCB225 | MS-45 | |
| C68 | .047 | 400 | CO-H-4503 | P4S8-047 | DF-503 | PTE4S47 | | PT4147 | 4TM-S47 | |
| C69 | 47 | 500 | RCM-30C-470K | 1469-00005 | | 5R5Q5 | | MCB325 | MS-45 | |
| C70 | 47 | 500 | RCM-20C-470K | 1469-00005 | | 5R5Q5 | | MCB225 | MS-45 | |
| C71 | .02 | 400 | CO-H-4203 | P4S8-02 | DF-203 | PTE4S2 | | PT412 | 4TM-S2 | |
| C72 | .05 | 400 | CO-H-4503 | P4S8-05 | DF-503 | PTE4S5 | | PT415 | 4TM-S5 | |
| C73 | .47 | 200 | CO-H-2474 | P2S8-47 | | PJ2P5 | | PT405 | 2TM-P47 | |
| C74 | 180 | 1000 | RCM-40C-181K | | | | | | | |
| C75 | .01 | 600 | CO-O-6103 | | | | | | | |
| C76 | .001 | 600 | CO-O-6102K | 1464-001 | | 1R5D1 | | MCB265 | MS-21 | |
| C77 | .001 | 600 | CO-O-6102K | 1464-001 | | 1R5D1 | | MCB265 | MS-21 | |
| C78 | .01 | 600 | CO-H-6103 | P6S8-01 | D6-103 | PTE6S1 | GP2-333-103 | PT611 | 6TM-S1 | |
| C79 | .047 | 400 | CO-H-4503 | P4S8-047 | DF-503 | PTE4S47 | | PT4147 | 4TM-S47 | |
| C80 | .25 | 400 | CO-H-4254 | P4S8-25 | | PTE4P25 | | PT4025 | 4TM-P25 | |
| C81 | .4 | 400 | CO-H-4104 | P4S8-1 | | PTE4P1 | | PT401 | 4TM-P1 | |
| C82 | .1 | 400 | CO-H-4104 | P4S8-1 | DF-104 | PTE4P1 | | PT401 | 4TM-P1 | |
| C83 | 56 | 2000 | CCD-560K | | | | | | | |
| C84 | .01 | 600 | CO-B-6103 | 6892X-01 | | PJ6S1 | | PT611 | 6TM-S1 | |
| C85 | .01 | 600 | CO-B-6103 | 6892X-01 | | PJ6S1 | | PT611 | 6TM-S1 | |

Note 1. Not used in all Models.
Note 2. Some Models use .005MFD in this application (part #CO-H-6503).
* Items C60A, C60B, C60C, R76A, R76B, R76C are combined in one unit.

## CONTROLS

| ITEM No | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: OLYMPIC PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 10000 | ½ | PT-2774 | QJ-404* | RTV-196 | SBB-653-S | UF152L | Contrast-Panel |
| B | 1 Meg | ½ | | | | | UR16A † | Volume-Rear |
| C | Switch | | | | | | US-26 † | Attach to R1B |
| R2A | 50KΩ | ½ | PT-2268 | QU-123 | AG-44-S | AB-31 | U-35 | Horiz. Hold |
| B | Shaft | | Not Req. | Not Req. | K8S-3 | AK-4 | Not Req. | Attach to R2A |
| R3A | 5000Ω | ½ | PT-2271 | QU-114 | AG-19-S | AB-10 | U-34 | Vert. Linearity |
| B | Shaft | | Not Req. | Not Req. | K8S-3 | AK-4 | Not Req. | Attach to R3A |
| R4A | 1 Meg | ½ | PT-2269 | QU-137 | AG-61-S | AB-69 | U-54 | Vert. Hold |
| B | Shaft | | Not Req. | Not Req. | K8S-3 | AK-4 | Not Req. | Attach to R4A |
| R5A | 2.5Meg | ½ | PT-2272 | QU-239 | AG-84-S | AB-83 | U-255 | Height |
| B | Shaft | | Not Req. | Not Req. | K8S-3 | AK-4 | Not Req. | Attach to R5A |
| R6A | 500KΩ | ½ | PT-2270 | QU-133 | AG-58-S | AB-59 | U-50 | Brightness |
| B | Shaft | | Not Req. | Not Req. | K8S-3 | AK-4 | Not Req. | Attach to R6A |

* CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS B17-109 & P1-109 (Panel)
B13-137 & R1-126 (Rear) & SWITCH 76-1.
† UNIVERSAL REPLACEMENT - (MALLORY EXACT DUPLICATE PART NO. UR1958).

## RESISTORS

| ITEM No. | RATING: OHMS | RATING: WATT | REPLACEMENT DATA: OLYMPIC PART No. | IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R7 | 22KΩ | ½ | | BTS-22K | |
| R8 | 47KΩ | ½ | | BTS-47K | |
| R9 | 220KΩ-5% | ½ | | BTS-220K-5% | |
| R10 | 100KΩ | ½ | | BTS-1000 | |
| R11 | 180KΩ-5% | ½ | | | |
| R12 | 4700Ω | ½ | | BTS-4700 | |
| R13 | 220KΩ | ½ | | BTS-220K | |
| R14 | 10Ω | ½ | | | |
| R15 | 15KΩ | ½ | | | |
| R16 | 10KΩ | ½ | | BTS-10K | |
| R17 | 10KΩ | ½ | | BTS-10K | |
| R18 | 4700Ω | 1 | REC-472M | BTA-4700 | |
| R19 | 10000Ω | 1 | RED-103M | BTS-1000 | |
| R20 | 10KΩ | 1 | RED-103K | | |
| R21 | 47Ω | 1 | RED-470M | BTS-47 | |
| R22 | 330Ω | 1 | RED-331M | BTS-330 | |
| R23 | 1000Ω | 1 | RED-102M | BTS-1000 | |
| R24 | 15KΩ | 1 | RED-153K | | |
| R25 | 47Ω | 1 | RED-470M | BTS-47 | |
| R26 | 330Ω | 1 | RED-331M | BTS-330 | |
| R27 | 10KΩ | 1 | RED-103K | | |
| R28 | 150Ω | 1 | RED-151M | BTS-150 | |
| R29 | 330Ω | 1 | RED-331M | BTS-330 | |
| R30 | 8200Ω | 1 | RED-822K | BTS-8200 | |
| R31 | 2.5Meg | 1 | RED-225K | BTS-2.5Meg | |
| R32 | 1 Meg | 1 | RED-105M | BTS-1 Meg | |
| R33 | 1 Meg | 1 | RED-105M | BTS-1 Meg | |
| R34 | 1 Meg | 1 | RED-105M | BTS-1 Meg | |
| R35 | 2.2Meg | 1 | RED-225K | BTS-2.2Meg | |
| R36 | 1 Meg | 1 | RED-105M | BTS-1 Meg | |
| R37 | 470KΩ | 1 | RED-474M | BTS-470K | |
| R38 | 5600Ω | 1 | RED-562K | BTS-5600 | |
| R39 | 5600Ω | 1 | RED-562K | BTS-5600 | |
| R40 | 1.5Meg | 1 | RED-155K | BTS-1.5Meg | |
| R41 | 2.2Meg | 1 | RED-225K | BTS-2.2Meg | |
| R42 | 1000Ω | 1 | RED-102M | BTS-1000 | |
| R43 | 68KΩ | 1 | REC-683M | BTA-68K | |
| R44 | 33KΩ | 1 | RED-333M | BTS-33K | |
| R45 | 4700Ω | 2 | RED-472K | BTS-4700 | |
| R46 | 220KΩ | 1 | RED-224M | BTS-220K | |
| R47 | 33KΩ | 1 | RED-333M | BTS-33K | |
| R48 | 100KΩ | 1 | RED-104M | | |
| R49 | 47Ω | 1 | RED-470M | BTS-47 | |

| ITEM No. | RATING: OHMS | RATING: WATT | REPLACEMENT DATA: OLYMPIC PART No. | IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R50 | 1000Ω | ½ | RED-102M | BTS-1000 | |
| R51 | 100KΩ | ½ | RED-104M | | |
| R52 | 47KΩ | ½ | RED-473M | | |
| R53 | 1000Ω | ½ | RED-102M | BTS-1000 | |
| R54 | 150Ω | ½ | RED-151M | BTS-150 | |
| R55 | 22KΩ | ½ | RED-223M | BTS-22K | |
| R56 | 10KΩ | ½ | RED-103K | BTS-10K | |
| R57 | 10KΩ | ½ | RED-103K | BTS-10K | |
| R58 | 10Meg | ½ | RED-106M | BTS-10Meg | |
| R59 | 470KΩ | ½ | RED-474M | BTS-470K | |
| R60 | 220KΩ | ½ | RED-224K | BTS-220K | |
| R61 | 100KΩ | ½ | RED-104M | BTS-100K | |
| R62 | 180KΩ | ½ | RED-184K | BTS-180K | |
| R63 | 390Ω | 2 | RED-391M | BTB-390 | |
| R64 | 470KΩ | ½ | RED-474M | BTS-470K | |
| R65 | 2.2Meg | ½ | RED-225K | BTS-2.2Meg | |
| R66 | 100KΩ | ½ | RED-104K | BTS-100K | |
| R67 | 47KΩ | ½ | RED-473M | BTS-47K | |
| R68 | 220KΩ | ½ | RED-224K | BTS-220K | |
| R69 | 47KΩ | ½ | RED-473M | BTS-47K | |
| R70 | 2.2Meg | ½ | RED-225K | BTS-2.2Meg | |
| R71 | 2700Ω | ½ | RED-272K | BTS-2700 | |
| R72 | 5600Ω | ½ | RED-562K | BTS-5600 | |
| R73 | 2700Ω | ½ | RED-272K | BTS-2700 | |
| R74 | 2.2Meg | ½ | RED-225K | BTS-2.2Meg | |
| R75 | 47KΩ | ½ | RED-473M | BTS-47K | |
| R76A | 22KΩ | ½ | | BTS-22K | |
| B | 8200Ω | ½ | *PC-2435 | BTS-8200 | |
| C | 8200Ω | ½ | | BTS-8200 | |
| R77 | 1.5Meg | ½ | RED-155K | BTS-1.5Meg | |
| R78 | 220KΩ | ½ | RED-224M | BTS-220K | |
| R79 | 470KΩ | ½ | RED-474M | BTS-470K | |
| R80 | 12KΩ | ½ | RED-123K | BTS-12K | Note 1 |
| R81 | 1.5Meg | ½ | RED-155K | BTS-1.5Meg | |
| R82 | 560Ω | 1 | RED-561K | BTS-560 | |
| R83 | 33KΩ | 1 | REC-333M | BTA-33K | |
| R84 | 1000Ω | 1 | REC-102M | BTA-1000 | |
| R85 | 560Ω | ½ | RED-561K | BTS-560 | |
| R86 | 560Ω | ½ | RED-561K | BTS-560 | |
| R87 | 2700Ω | ½ | RED-272K | BTS-2700 | |
| R88 | 150KΩ | ½ | RED-154K-A | BTS-150K | |
| R89 | 75KΩ-5% | ½ | | BTA-75K-5% | Note 2 |
| R90 | 180KΩ | ½ | RED-184K-A | BTS-180K | |

## RESISTORS (CONT.)

| ITEM No. | RATING: OHMS | RATING: WATT | REPLACEMENT DATA: OLYMPIC PART No. | IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R91 | 330KΩ | ½ | RED-334K-A | BTS-330K | |
| R92 | 820KΩ | ½ | REC-824K-A | BTA-820K | |
| R93 | 82KΩ-5% | 1 | REC-823J-A | BTA-82K-5% | |
| R94 | 330KΩ-5% | 1 | REC-334J-A | BTA-330K-5% | |
| R95 | 3900Ω | ½ | RED-392K | BTS-3900 | |
| R96 | 150KΩ 5% | 1 | REC-154J-A | BTA-150K-5% | |
| R97 | 22KΩ | ½ | RED-223M | BTS-22K | |
| R98 | 8200Ω | ½ | RED-822M | BTS-8200 | |
| R99 | 82KΩ-5% | 1 | REC-823J-A | BTA-82K-5% | |

| ITEM No | RATING: OHMS | RATING: WATT | REPLACEMENT DATA: OLYMPIC PART No | IRC PART No | NOTES |
|---|---|---|---|---|---|
| R100 | 220KΩ | ½ | RED-224K | BTS-220K | |
| R101 | 470KΩ | ½ | RED-474M | BTS-470K | |
| R102 | 100KΩ | ½ | RED-104M | BTS-100K | Note 3 |
| R103 | 47Ω | ½ | RED-470M | | |
| R104 | 100Ω | 1 | REC-101M | BTA-100 | |
| R105 | 22KΩ | 2 | RED-223K | BTB-22K | |
| R106 | 100KΩ | ½ | RED-104M | BTS-100K | |
| R107 | 47KΩ | ½ | RED-473M | BTS-47K | |
| R108 | 100KΩ | 1 | REC-104M | BTA-100K | |

Note 1. Some models may use a 10KΩ resistor in this application.
Note 2. Some models may use a 68KΩ resistor in this application.
Note 3. Some Models may use a 150KΩ resistor in this application.
* Items R76A, R76B, R76C, C60A, C60B, C60C are combined in one unit.

## TRANSFORMER (POWER)

| ITEM No. | RATING: PRI. | RATING: SEC. 1 | RATING: SEC. 2 | RATING: SEC. 3 | REPLACEMENT DATA: OLYMPIC PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. | RCA TYPE No. |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 117VAC @1.58A | 600VCT @.200ADC | 5VAC @3A | 6.3VAC @1.2A<br>SEC. 4<br>6.3VAC @6A | TR-2770 | | | TP-319 ① | R-39BC① | |

① Drill new mounting holes.

## TRANSFORMER (SWEEP CIRCUITS)

| ITEM No. | RATING: DC RESISTANCE PRI | RATING: DC RESISTANCE SEC | REPLACEMENT DATA: OLYMPIC PART No. | STANCOR PART No | MERIT PART No | CHICAGO PART No | TRIAD PART No | RCA TYPE No | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| T2 | 180Ω | 970Ω | TR-1473 | A-8125 | A-3003 | TBC-5 | A-97X | 206T2 10 | Vert. Osc. Trans. |
| T3 | 595Ω tap ④ @20Ω | 250 tap ④ 2.5Ω, 8Ω, 21Ω<br>SEC. 2<br>0Ω | TR-2771-1 | | HVO-3 ① | TPB-13 ② | D-19 ③ | 225T1 ⑤ | Horiz. Output Trans. |
| T4 | 1600Ω | 5.5Ω | TR-2765 | A-6141 ④ | A-3039 ④ | TSO-12 ④ | A-104X ④ | 236T1 ④ | Vert. Output Trans. |
| T5A | 17Ω | | CL-2753 | DY-8A ⑤ | MDF-72 ⑤ | TY-3 ④ | Y-17 ⑤ | 21DY2 ⑤ | Horiz. Deflection Coils |
| B | 49Ω | | | | | | | | Vert. Deflection Coils |
| T6 | 21Ω | | CL-2752 | WC-5 ⑦ ⑥ | MWC-1⑦ ⑥ | TWL-1 | WC-11⑦ | 212R1 | Width Coil |

① Do not connect terminal 7 to terminal 8.
② Wire as in original circuit.
③ Wire as in original circuit, except, no connection to terminal "7".
④ Connect blue lead to plate, red lead to yellow lead of yoke, disconnect green lead of yoke from ground. Tie green lead of yoke to green lead of transformer and connect to point of original B+.
⑤ Use original horizontal deflection coil network if necessary.
⑥ Use original deflection coil network.
⑦ Enlarge mounting hole.
⑧ Do not use secondary.
⑨ Connect to coded blue and red terminals.
⑩ Mount on top of chassis.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING: IMPEDANCE PRI | RATING: IMPEDANCE SEC. | RATING: DC RES PRI | RATING: DC RES SEC | REPLACEMENT DATA: OLYMPIC PART No | STANCOR PART No | MERIT PART No | CHICAGO PART No | TRIAD PART No | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| T7 | 22.8Ω | 3.5Ω | 226Ω | .54Ω | TR-2766 | A-3876 | A-2938 | RO-2 | S-2X | |

## SPEAKER

| ITEM No. | RATINGS: SIZE | RATINGS: FIELD | RATINGS: V C IMP | REPLACEMENT DATA: OLYMPIC PART No. | JENSEN PART No. | QUAM PART No. | NOTES |
|---|---|---|---|---|---|---|---|
| SP1A | 5" | PM | 3.5Ω | SK-1788-1 | ST-105<br>Mod P5-X<br>VIKING | 5A1 | ① Used in Model 17K55 and 17C57 |
| B | 10" | PM | 3.5Ω | SK-1789-1 ① | 10J11 | 10A31 | |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. PRI | DC RES. SEC | REPLACEMENT DATA: OLYMPIC PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No | NOTES |
|---|---|---|---|---|---|---|---|---|
| L1 | Ant. Coils | 0Ω CT | 0Ω | | | | | |
| L2 | Pil. Choke | 0Ω | | | | | | |
| L3 | Neutr. Coil | 0Ω | | | | | | |
| L4 | RF, Mixer Grid & Osc. Coils | 0Ω | | | | | | |
| L5 | Pil. Choke | 0Ω | | | | | | |
| L6 | 1st. Video IF | 1Ω | | | | | | |
| L7 | 2nd. Video IF | .2Ω | .2Ω | CL-2309 | 17-1063 | | 6249 | |
| L8 | Adj. Channel Sound Trap | 0Ω | | CL-2973 | 20-1006 | | 6171A | Olympic part number includes C32 |
| L9 | 3rd. Video IF | .2Ω | .2Ω | CL-2309 | 17-1064 | | 6250 | |
| L10 | 4th. Video IF | .2Ω | .2Ω | CL-2309 | 17-1063 | | 6249 | |
| L11 | Accompanying Sound Trap | 0Ω | | CL-2972 | 20-1021 | TV-112 * | 6171 * | Olympic part number includes C36 |
| L12 | Series Peaking Coil | 2.4Ω | | CL-1535 | 19-3036 | TV-180 | 6176 | 36 Microhenries |
| L13 | Series Peaking Coil | 5Ω | | CL-1536 | 19-3125 | | 6183 | 120 Microhenries |

17C57, 17K55, 17T56 (Ch. TM-17)
OLYMPIC MODELS

# PARTS LIST AND DESCRIPTIONS (Continued)

| ITEM No. | USE | DC RES. PRI. | DC RES. SEC. | REPLACEMENT DATA OLYMPIC PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|
| L14 | Shunt Peaking Coil | 11Ω | | CL-2614 | 19-3500 | TV-188 | 6174 | 500 Microhenries |
| L15 | Series Peaking Coil | 6.3Ω | | CL-1537 | 19-3125 † | TV-182 | 6178 | 120 Microhenries, wound on 22KΩ resistor |
| L16 | 4.5MC Trap | 2Ω | | CL-2331 | 20-1004 | TV-151 | 1470 | Olympic part number includes C41 |
| L17 | Shunt Peaking Coil | 7.5Ω | | CL-2073 | 19-3250 | TV-185 | 6181 | 250 Microhenries |
| L18 | Sound IF | 2Ω | 2Ω | TR-2977 | | TV-113 | 6203 | |
| L19 | Ratio Det. | 5Ω | 1.7ΩCT | TR-2630 | 17-3497 | TV-115 | 6205 | Tertiary winding-.4Ω |
| L20 | Horiz. Osc. | 72Ω | | TR-2990 | 20-1402 | TV-162 | 6183 | Tapped @ 50Ω, horiz. waveform winding -42Ω |

* Enlarge mounting hole.
† Parallel with 22KΩ resistor.

## FILTER CHOKE

| ITEM No. | RATINGS TOTAL DIRECT CURRENT | RATINGS D. C. RESISTANCE | RATINGS INDUCTANCE (0 CURRENT 1000 ∿) | REPLACEMENT DATA OLYMPIC PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. |
|---|---|---|---|---|---|---|---|---|
| L21 | .200A | 64Ω | 2Hy. | CK-1346 | C-2325 ① | C-2991 ① | TR-4200 ① | C-17X |

① Drill one new mounting hole.

## MISCELLANEOUS

| ITEM No. | PART NAME | OLYMPIC PART No. | NOTES |
|---|---|---|---|
| M1 | RF Tuner | CL-2755-1 | |
| M2 | Switch | | Local-Distance |
| M3 | Centering Magnet | PP-2763 | |
| M4A | Ion Trap Magnet | PP-2248 | (Red Dot) |
| B | Ion Trap Magnet | PP-2623 | (Green Dot) |
| B3 | Trimmer Cap. | CT-2757 | Horiz. Drive (50-370MMF) |
| | Cabinet | CA-2912 | For Model 17T56 |
| | Cabinet | CA-2914 | For Model 17C57 |
| | Cabinet | CA-2916 | For Model 17K55 |
| | Cabinet Back | ST-2924 | For Model 17T56 |
| | Cabinet Back | ST-2802 | For Model 17C57 |
| | Cabinet Back | ST-2803 | For Model 17K55 |
| | Escutcheon | MP-2969 | (Moulded) |
| | Safety Glass | PP-2937 | |
| | Mask | PP-2939 | |
| | Knob | KN-2296 | Fine Tuning (Mahogany) |
| | Knob | KN-2295-1 | Channel Selector (Mahogany with gold fill-in ) |
| | Knob | KN-2297-1 | Volume Control (Mahogany with gold fill-in) |
| | Knob | KN-2298 | Contrast |
| | Knob | KN-2545 | Channel Selector (Tan) |
| | Knob | KN-2546 | Fine Tuning (Tan) |
| | Knob | KN-2547 | Volume Control (Tan) |
| | Knob | KN-2548 | Contrast (Tan) |

# TROUBLE SHOOTING AIDS (CONT.)

## AUDIO

**WEAK OR NO SOUND**

Check by substitution V6, V8, V9, V10 and V11. Check adjustment of discriminator. Check all components in sound system, especially, the speaker, T6 and the coupling capacitor C43.

**BUZZ**

Substitute V9. Check adjustment of discriminator secondary. Check setting of local oscillator. Check for overload at waveform W1. If overload exists, check AGC circuit.

**DISTORTED**

Check by substitution V6, V8, V9, V10 and V11. Check audio stages using audio signal generator and scope.

| If Undistorted | If Distorted |
|---|---|
| Check adjustment of sound discriminator. Check components of V6B, V8 and V9. | Check components of stage where distortion occurs. |

## HIGH VOLTAGE

**LOSS OF HIGH VOLTAGE**

Check by substitution V15, V16, V17 and V18. Check 1/4 amp. fuse located under the chassis. Check waveform W15.

| If Unsatisfactory | If Satisfactory |
|---|---|
| Check all components of V15 and coupling network between V15 and V16. | Check all components of V16, V17 and V18, especially T3 and T5A. |

**INSUFFICIENT HIGH VOLTAGE**

Follow procedure outlined under "Loss of High Voltage".

**BLOOMING**

Follow procedure outlined under "Loss of High Voltage" and "Small Raster".

## POWER

**SET DEAD**

Substitute V19. Check all B+ components including T1 and the interlock.

**SMALL RASTER**

Substitute V19. Check "Line Voltage". Check B+ filters. Check Boost B+.

**DIM PICTURE**

Follow procedure outlined under "Small Raster" and "Loss of High Voltage". Check picture tube for low emission.

## GENERAL

**RASTER NO SOUND NO PICTURE**

Check by substitution V2, V3, V4 and V6. Check tuner and video IF components.

**WEAK PICTURE WEAK SOUND**

Check tuner and video IF tubes and components. Check V11 particularly as it acts as voltage divider for the video IF and sync tubes.

**VERY SNOWY PICTURE**

Check V1 and associated components. Check alignment.

**SOUND NO PICTURE**

Check V7 and associated components. Check picture tube.

**INTERMITTENT STREAKS**

Check high voltage circuit for corona arcing and discharge.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this receiving equipment.

# SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch - up adjustments of the RF Tuner Oscillator Circuit may be accomplished by removal of the Channel Selector and Fine Tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the Channel Selector shaft.

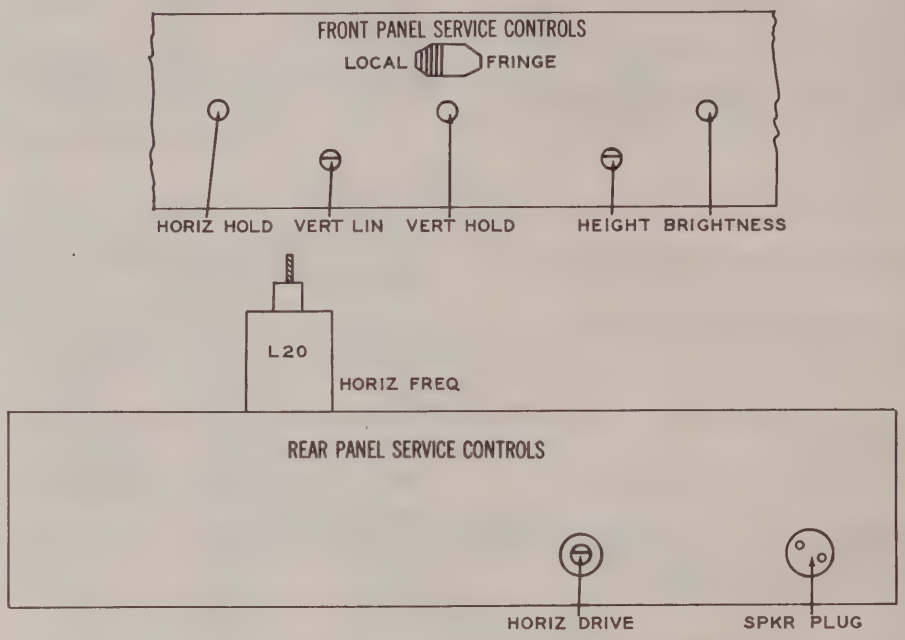
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove three wood screws holding wood strip at top of cabinet. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions ).

SERVICE ADJUSTMENT LOCATION




HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the Horiz. Oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis. Set the Horiz. Hold Control at the center of its range and adjust the Horiz. Freq. slug, L20, until picture synchronizes horizontally. (For location see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector Buzz, adjust the Ratio Detector Secondary, L19, located on top of chassis. (See tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

# DISASSEMBLY INSTRUCTIONS

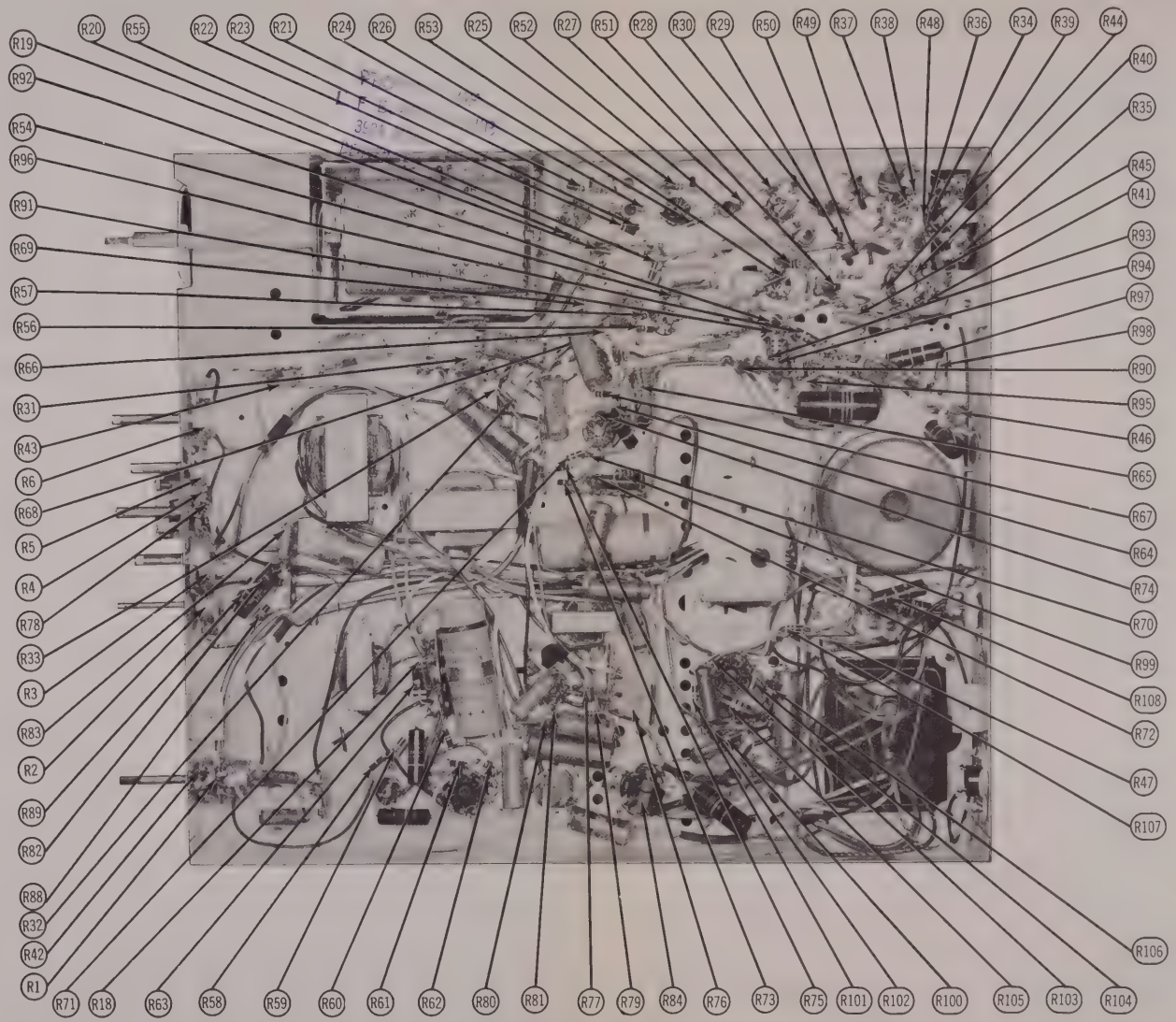
Remove 4 push on type control knobs from front panel.

Remove 2 wood & 2 metal screws. Remove rear cover.

Disconnect built-in antenna, Speaker plug.

Remove 5 chassis bolts. Remove chassis.

Remove 4 speaker nuts. Remove speaker . (Not necessary for removal of chassis).




CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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MODEL 2218X

PACIFIC-MERCURY MODELS 2217, 2218, X, 2224, 2284 (Ch. 200-11)

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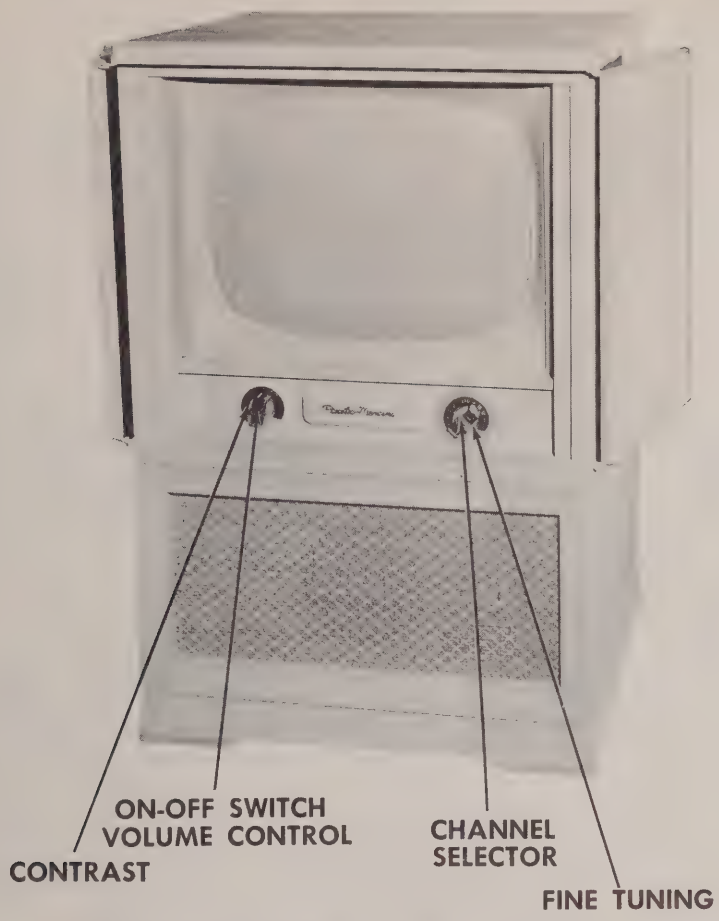


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PACIFIC-MERCURY MODELS 2217, 2218, X, 2224, 2284 (Ch. 200-11)

PACIFIC-MERCURY MODEL 2218X

| | |
|---|---|
| TRADE NAME | Pacific-Mercury Models 2217, 2218, 2218X, 2224, 2284 (Ch. 200-11) |
| MANUFACTURER | Pacific-Mercury Television Mfg. Corp., 5955 Van Nuys Blvd, Van Nuys, California |
| TYPE SET | Television Receiver |
| TUBES | Twenty-Two |

POWER SUPPLY 110-120 Volts AC-60 Cycle RATING 1.9 Amp @ 117 Volts AC
TUNING RANGE—Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier).

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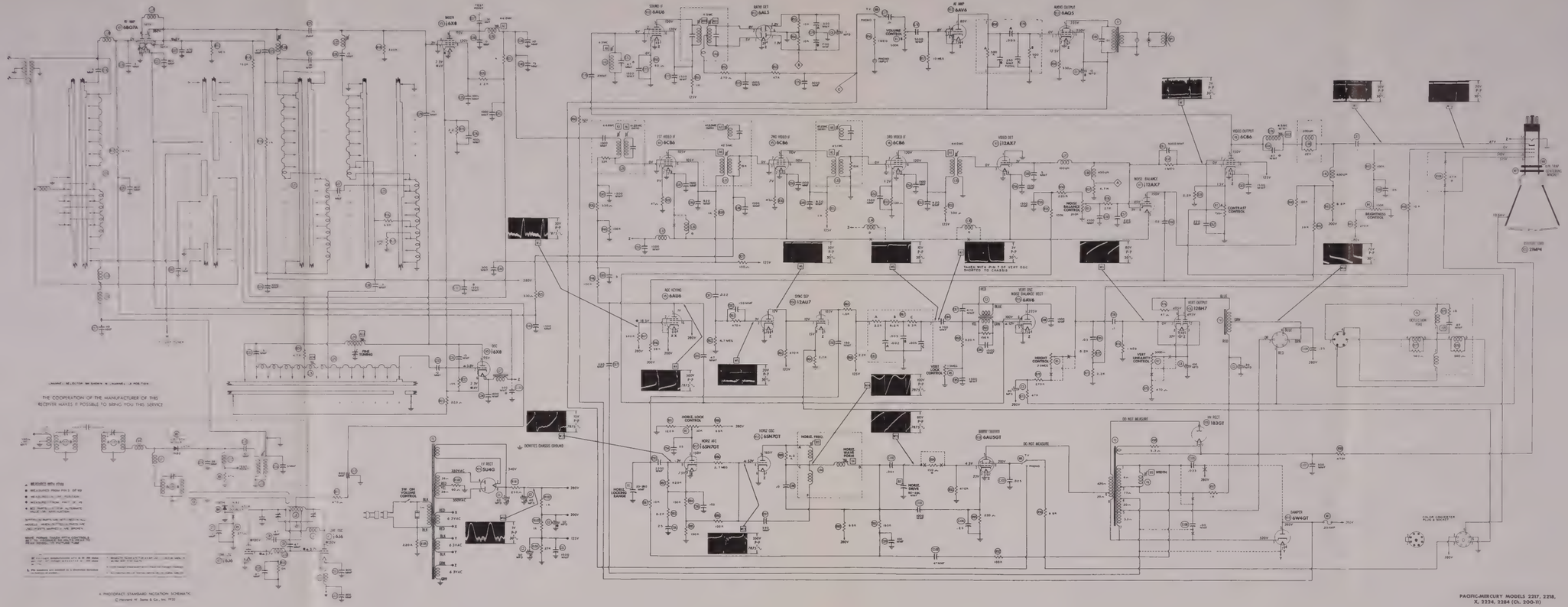

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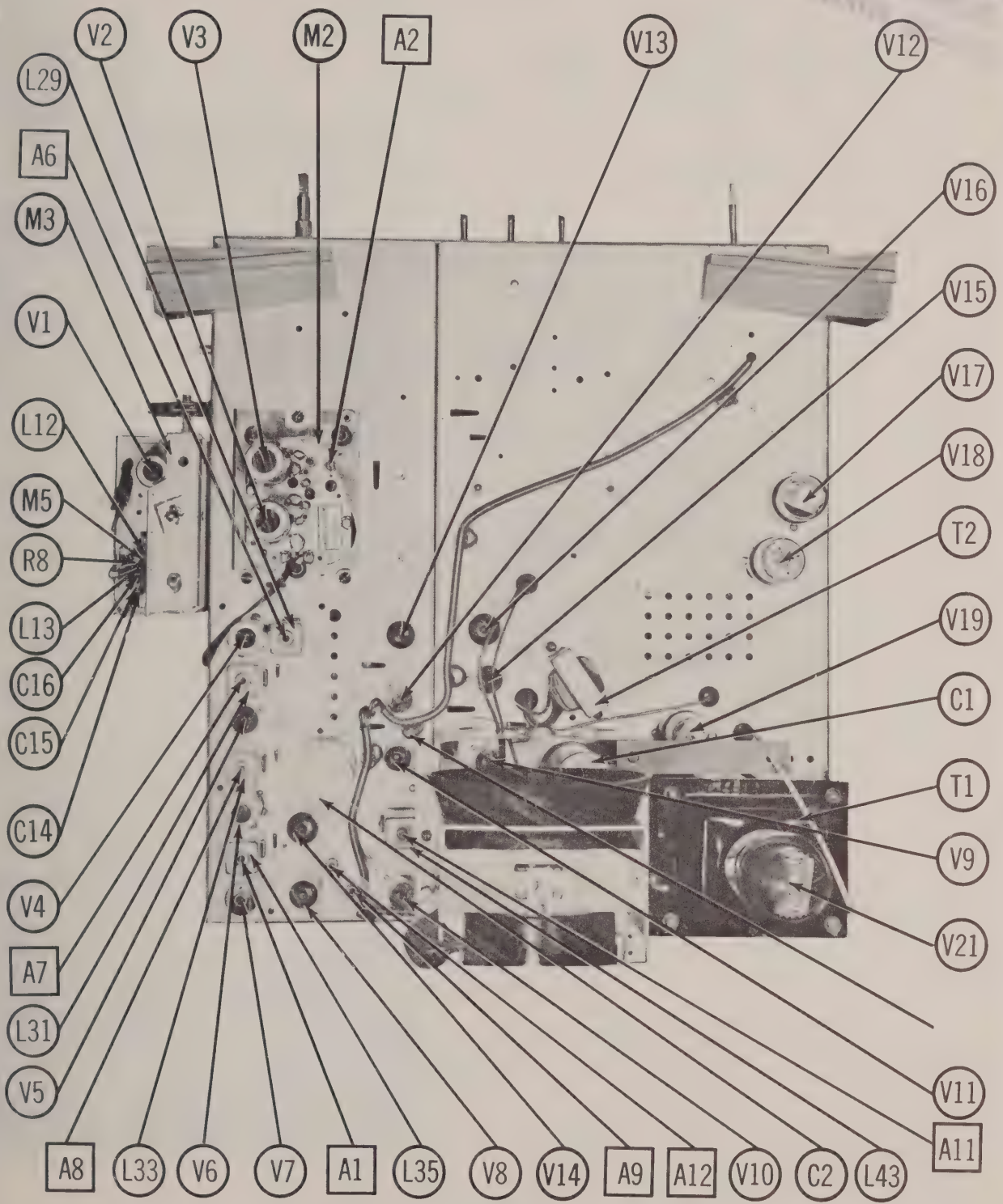
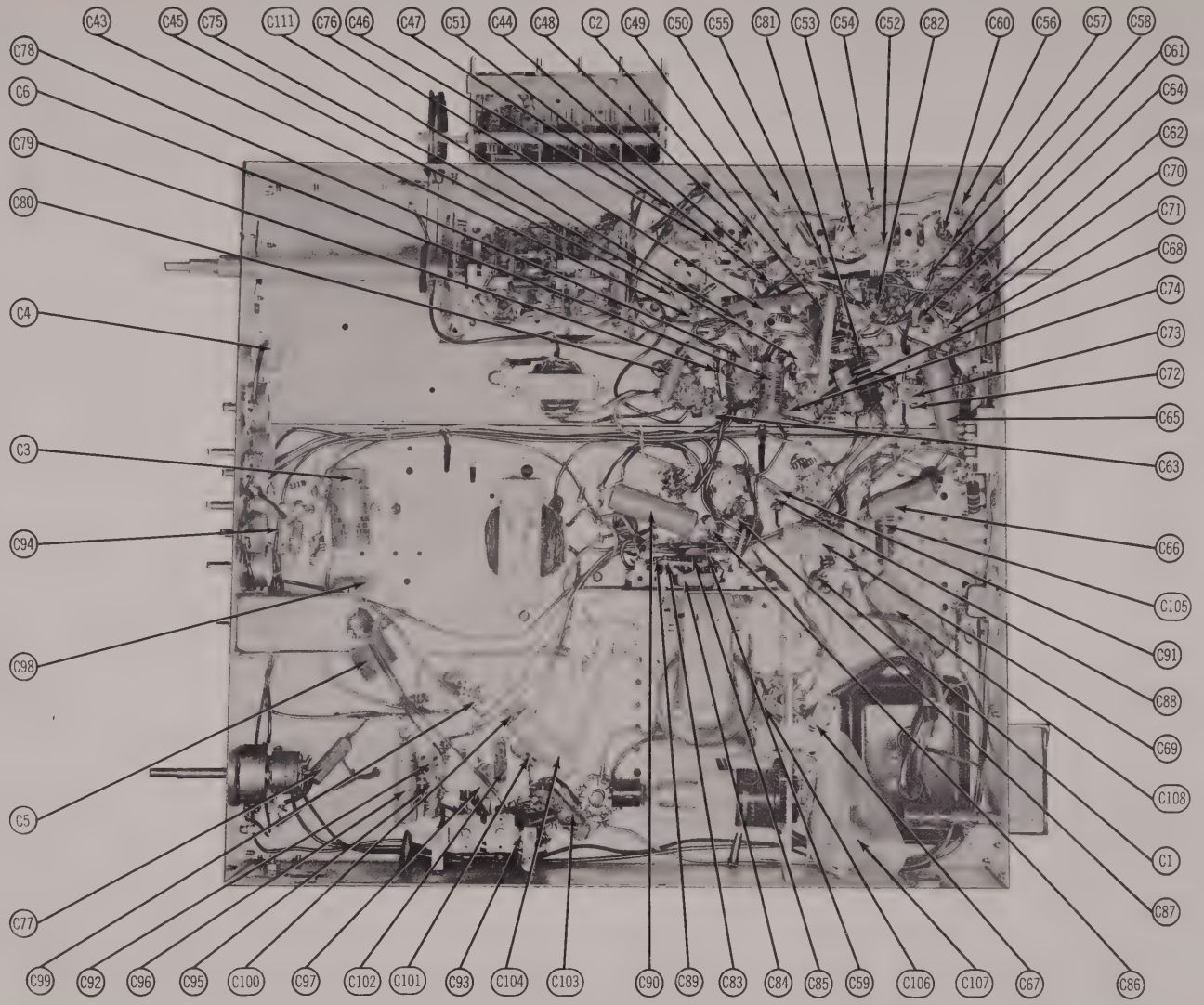
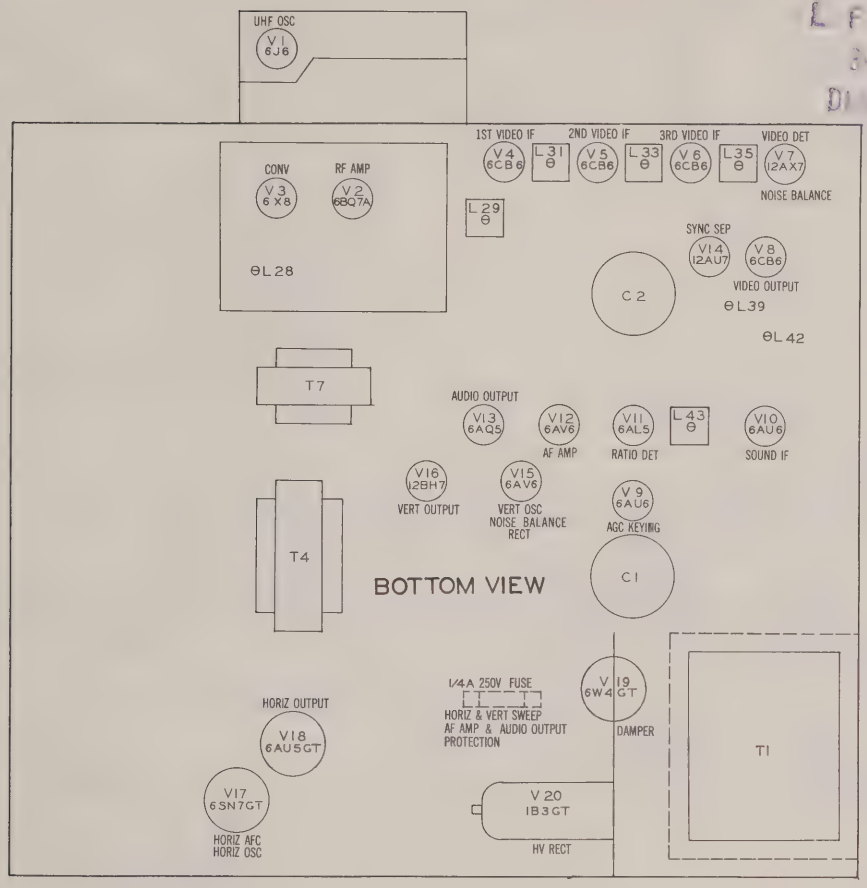



CHASSIS TOP VIEW




CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

# TUBE PLACEMENT CHART




# TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V21**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, V5, V6, V7, V8 (V1 UHF Only)**
No pic, no sound, has snow - **V2, V3, V4**
No pic, has sound, has raster - **V8, V22**
Has pic, no sound - **V10, V11, V12, V13**
Overloaded picture - **V9**

SYNC FAILURE
No vert. sync -**V14, V15, V16**
No horiz. sync - **V14, V17**
No vert. or horiz. sync - **V14**

SWEEP FAILURE
No raster, has sound - **V17, V18, V19, V20, V22 Fuse (M1)**
No vertical deflection - **V15, V16**
Poor vert. linearity or foldover - **V15, V16**
Poor horiz. linearity or foldover - **V17, V18, V19**
Narrow picture - **V17, V18, V19, V20, V21**
Vert. off freq. - **V14, V15, V16**
Horiz. off freq. - **V14, V17**

# ALIGNMENT INSTRUCTIONS

## ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal oscillator tube, V17, from its socket.
Set noise balance control fully clockwise.

### VIDEO IF ALIGNMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | Direct | High side to an ungrounded tube shield floating over converter tube, V3. Low side to chassis. | 44MC (Unmod) | 7 or 13 | DC probe to point (A). Common to chassis. | A1 | Adjust for maximum deflection. Attenuate generator output to maintain 1 to 1½ volts at VTVM. |
| 2. | " | " | 44MC | " | " | A2 | Connect a 1KΩ resistor from pin 1 (grid) of 6CB6 (V4) to the AGC line (lug 8 on tuner terminal board). Adjust A2 for maximum deflection. Remove the 1KΩ resistor from the grid of V4. |
| 3. | " | " | 44.6MC | " | " | A3 | Adjust for maximum deflection. |
| 4. | " | " | 42.50MC | " | " | A4 | " |
| 5. | " | " | 45.1MC | " | " | A5 | " |
| 6. | " | " | 41.25MC | " | " | A6, A7 | Adjust for MINIMUM deflection. |
| 7. | " | " | 47.25MC | " | " | A8 | " |
| 8. | Repeat steps 3, 4 and 5 . | | | | | | |
| 9. | Repeat Step 1. | | | | | | |

### OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Connect the negative lead of a 3 volt battery to the AGC lead. Connect the positive lead to chassis.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 10. | Direct | High side to an ungrounded tube shield floating over converter tube, V3. Low side to chassis. | 44MC (10MC Swp) | 41.25MC 42.25MC 45.75MC 47.25MC | 7 or 13 | Vert. Amp. to point (A). Low side to chassis. | | Check for response similar to Fig. 1. If necessary retouch A1 thru A5 for desired response. |

### SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 11. | .01MFD | High side to pin 1 (grid) of 6CB6 (V8). Low side to chassis. | 4.5MC (Unmod) | 7 or 13 | DC probe to point (B). Common to chassis. | A9, A10 | Adjust for maximum deflection. |
| 12. | " | " | " | " | DC probe to point (C). Common to chassis. | A11 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

### SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 11. | .01MFD | High side to pin 1 (grid) of 6CB6 (V8). Low side to chassis. | 4.5MC ( 450KC Swp | 4.5MC | 7 or 13 | Vert. Amp. to point (B). Low side to chassis. | A9, A10 | Disconnect stabilizer capacitor, C6. Adjust for curve of maximum amplitude and symmetry as in Fig. 2. |
| 12. | " | " | " | " | " | Vert. Amp. to point (C). Low side to chassis. | A11 | Reconnect capacitor C6. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines. |

### 4.5MC TRAP ALIGNMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 13. | .01MFD | High side to pin 1 (grid) of 6CB6 (V8). Low side to chassis. | 4.5MC (Unmod) | 7 or 13 | DC probe thru detector (Fig. 4) to pin 11 (cathode) of picture tube. Common to chassis. | A12 | Adjust for MINIMUM deflection. |

# ALIGNMENT INSTRUCTIONS (CONT.)

## VHF OSCILLATOR ALIGNMENT

Connect bias battery as under Overall Video IF Response Check.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 14 | Two 120Ω Carbon Resistors | Across VHF antenna terminals with 120Ω in each lead. | 213MC (10MC Swp) | 211.25MC 215.75MC | 13 | Vert. Amp. to point (A). Low side to chassis. | A13 | Adjust to place sound marker in trap notch as in Fig. 5. Video marker should be at 50%. |
| 15. | " | " | 207MC (10MC Swp) | 205.25MC 209.75MC | 12 | " | | Check for sound marker placement as in Fig. 5. If necessary make slight compromise adjustment of A13 for best marker placement on all high band channels. |
| | | | 201MC (10MC Swp) | 199.25MC 203.75MC | 11 | | | |
| | | | 195MC (10MC Swp) | 193.25MC 197.75MC | 10 | | | |
| | | | 189MC (10MC Swp) | 187.25MC 191.75MC | 9 | | | |
| | | | 183MC (10MC Swp) | 181.25MC 185.75MC | 8 | | | |
| | | | 177MC (10MC Swp) | 175.25MC 179.75MC | 7 | | | |
| 16. | " | " | 85MC (10MC Swp) | 83.25MC 87.75MC | 6 | " | A14 | Adjust to place sound marker in trap notch as in Fig. 5. Video marker should be at 50%. |
| 17. | " | " | 79MC (10MC Swp) | 77.25MC 81.75MC | 5 | " | | Check low band channels for correct sound marker placement as in Fig. 5. If necessary make slight compromise adjustment of A14 for best marker placement on all low band channels. |
| | | | 69MC (10MC Swp) | 67.25MC 71.75MC | 4 | | | |
| | | | 63MC (10MC Swp) | 61.25MC 65.75MC | 3 | | | |
| | | | 57MC (10MC Swp) | 55.25MC 59.75MC | 2 | | | |

THE RF SECTION OF THE VHF TUNER AND THE UHF TUNER HAVE BEEN PROPERLY ALIGNED AT THE FACTORY AND ARE VERY STABLE. ALIGNMENT OF THESE PORTIONS OF THE RECEIVER SHOULD NOT BE REQUIRED IN THE FIELD.

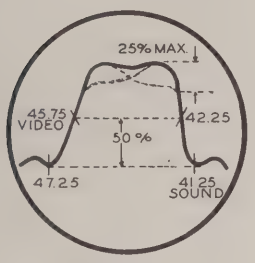


FIG. 1

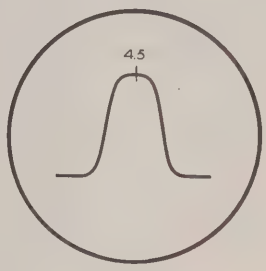


FIG. 2

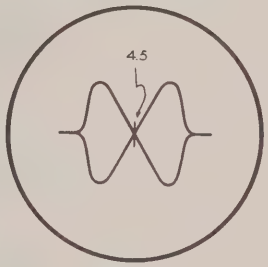


FIG. 3

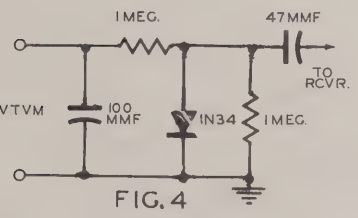


FIG. 4

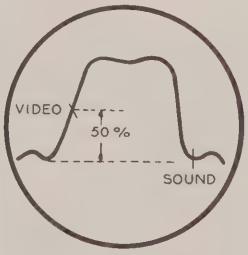
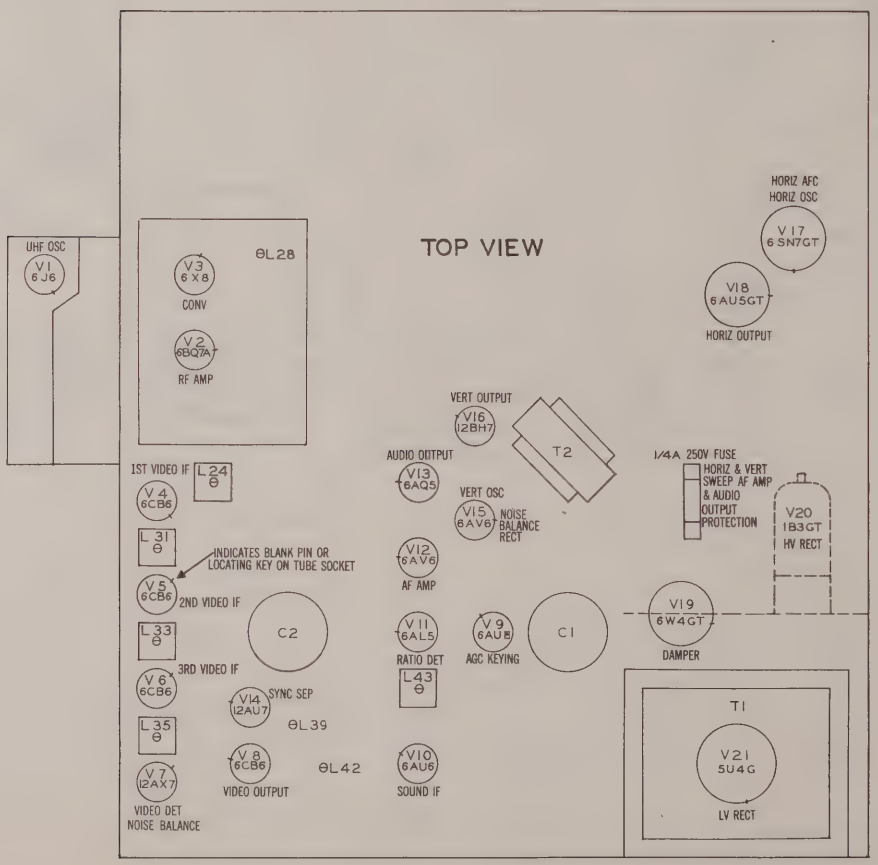


FIG. 5

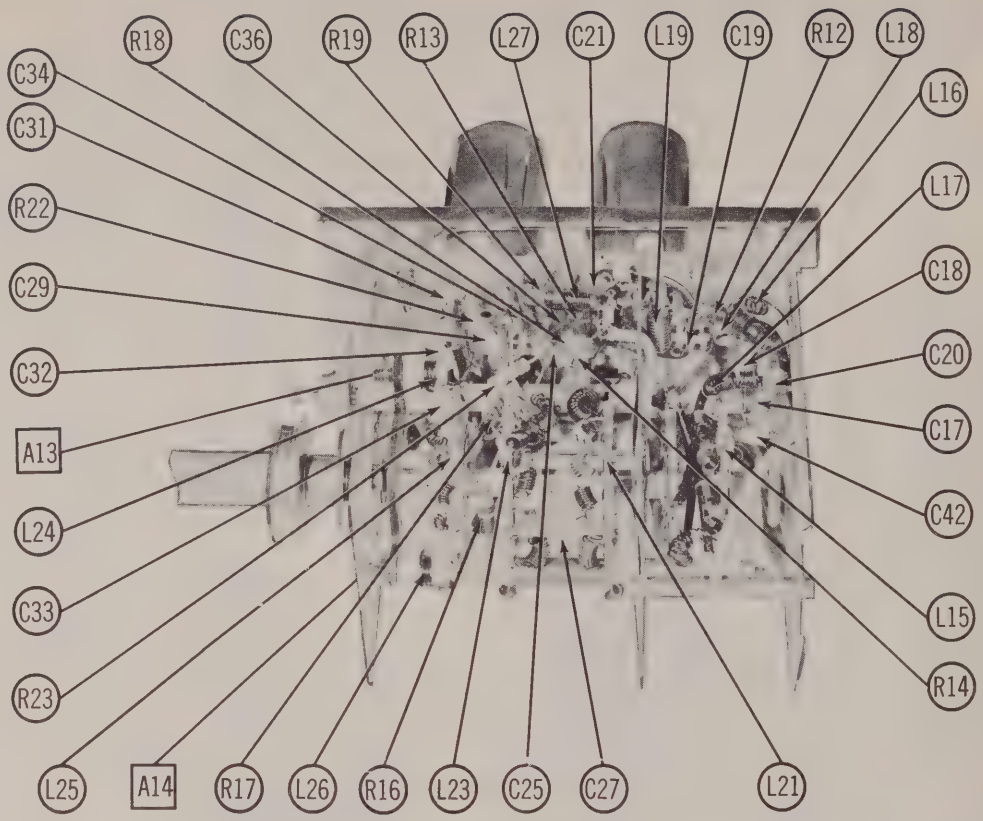
# RESISTANCE MEASUREMENTS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 6J6 | †▲2.9KΩ | †▲2.9KΩ | 0Ω | .1Ω | 10KΩ | 10KΩ | 0Ω | | |
| V 2 | 6BQ7A | †1.2KΩ | †425KΩ | INF | .1Ω | 0Ω | INF | 105KΩ | 0Ω | 0Ω |
| V 3 | 6X8 | 0Ω | 17.2KΩ ▲15.2KΩ | †7KΩ | 0Ω | .1Ω | 200Ω ▲2.2KΩ | 220KΩ | †4.5KΩ | †3.3KΩ |
| V 4 | 6CB6 | 133KΩ | 47Ω | 0Ω | .1Ω | †3.4KΩ | †3.4KΩ | 0Ω | | |
| V 5 | 6CB6 | 100KΩ | 47Ω | .1Ω | 0Ω | †3.3KΩ | †3.3KΩ | 0Ω | | |
| V 6 | 6CB6 | .1Ω | 150Ω | .1Ω | 0Ω | †2.6KΩ | †2.6KΩ | 0Ω | | |
| V 7 | 12AX7 | 0Ω | 4.7KΩ | .1Ω | .1Ω | .1Ω | †105KΩ | 260KΩ | 4.7KΩ | 0Ω |
| V 8 | 6CB6 | 1Meg | 140Ω | .1Ω | 0Ω | †7.4KΩ | †2.2KΩ | 140Ω | | |
| V 9 | 6AU6 | †21.7KΩ | †1.2KΩ | INF | INF | 200KΩ | †250Ω | †1.2KΩ | | |
| V 10 | 6AU6 | 2Ω | 0Ω | .1Ω | 0Ω | †3.2KΩ | †3.2KΩ | 82Ω | | |
| V 11 | 6AL5 | INF | INF | 0Ω | .1Ω | 10KΩ | 0Ω | 10KΩ | | |
| V 12 | 6AV6 | 10Meg | 0Ω | 0Ω | .1Ω | 0Ω | 0Ω | †500KΩ | | |
| V 13 | 6AQ5 | 500KΩ | 330Ω | 0Ω | .1Ω | †1.5KΩ | †1.1KΩ | 500KΩ | | |
| V 14 | 12AU7 | †470KΩ | 5.1Meg | 0Ω | .1Ω | .1Ω | †6.2KΩ | †470KΩ | 2.7KΩ | 0Ω |
| V 15 | 6AV6 | 1.7Meg | 0Ω | 0Ω | .1Ω | 0Ω | 570KΩ | ‡2.8Meg | | |
| V 16 | 12BH7 | ‡2.5KΩ | 1Meg | 3.2KΩ | .1Ω | .1Ω | ‡2.5KΩ | 1Meg | 3.2KΩ | 0Ω |
| V 17 | 6SN7GT | 880KΩ | †60KΩ | 295KΩ | 245KΩ | †68KΩ | 0Ω | .1Ω | 0Ω | |
| V 18 | 6AU5GT | 470KΩ | .1Ω | 220Ω | INF | ‡20Ω | INF | 0Ω | †7KΩ | |
| V 19 | 6W4GT | ‡31Ω | INF | 1Meg | INF | †250Ω | 200KΩ | INF | INF | |
| V 20 | 1B3GT | PINS 1 - 8 HAVE INF RESISTANCE | | | | | | | | Top Cap ‡440Ω |
| V 21 | 5U4G | INF | 24KΩ | INF | .86Ω | INF | 88Ω | INF | 24KΩ | |
| V 22 | 21MP4 | 0Ω | 12.2KΩ | PIN 6 ‡1KΩ | PIN 10 ‡48KΩ | PIN 11 140KΩ | PIN 12 .1Ω | | | |

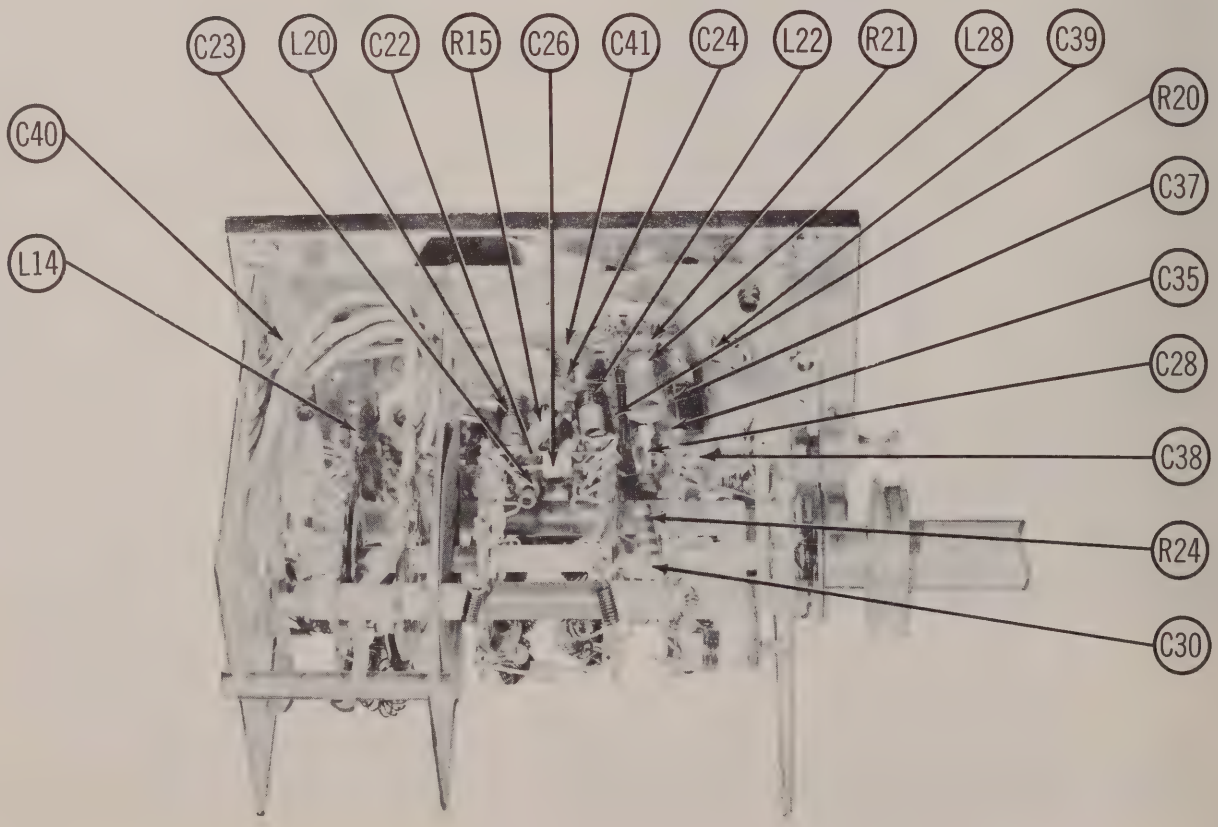
ALL MEASUREMENTS TAKEN IN "VHF" POSITION UNLESS OTHERWISE SPECIFIED.
▲ MEASURED IN " UHF" POSITION
† MEASURED FROM JUNCTION OF R101 and C1A.
‡ MEASURED FROM PIN 3 of V19.



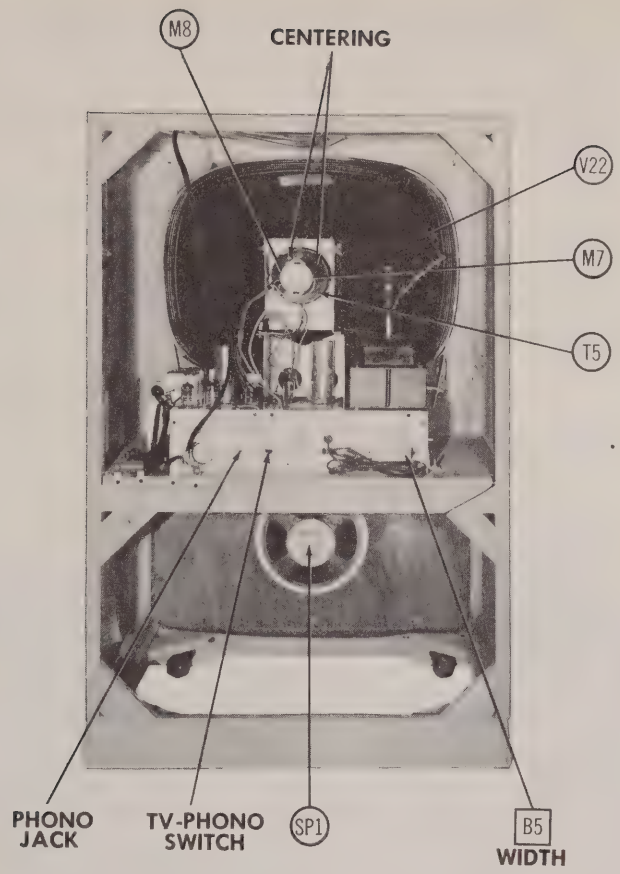

# TUBE PLACEMENT CHART




RF TUNER-RIGHT SIDE




RF TUNER-LEFT SIDE




CABINET-REAR VIEW

## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the noise balance control to maximum clockwise.

Connect the vertical input of an oscilloscope through a 10 to 50MMF capacitor to terminal "C" on L44.

Connect the DC probe of a VTVM to pin (grid) of 6AU5, V18. Connect the common lead to chassis.

Set the horizontal locking range trimmer (B1) 1/4 turn from tight.

Set the horizontal drive trimmer (B2) for -9 volts on VTVM.

With horizontal lock control at center of its range, adjust the horizontal frequency slug (B3) to sync the picture horizontally.

Adjust the horizontal waveform slug (B4) for a waveform on the oscilloscope as in Fig. 6, with broad and narrow peaks of equal height. If necessary, while adjusting B4, keep the picture in sync by turning B3.

Set the horizontal lock control at maximum clockwise position and switch off channel and back. There should be 3 diagonal bars present in the picture. Retouch B3 for that number, if necessary.

When switching channels, picture should pull in sync over half the rotation range of the horizontal lock control. If sync range is less, adjust B1 counter clockwise for desired result.

If picture jitters at any position of the horizontal lock control, turn control clockwise to position that produces the greatest amount of jitter and adjust B3 clockwise until jitter is eliminated. If adjustment of B3 does not eliminate jitter adjust B1 in clockwise direction.

Adjust the width control slug (B5) for picture slightly wider than necessary to fill the picture mask horizontally.

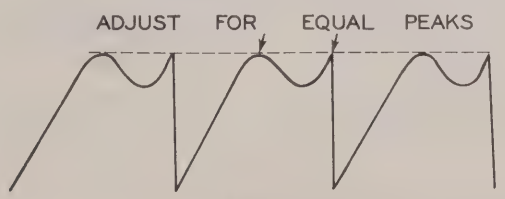



FIG. 6

# TROUBLE SHOOTING AIDS

## SWEEP

### HORIZONTAL

**LOSS OF SWEEP**

See "Loss of High Voltage".

**INSUFFICIENT SWEEP**

Check by substitution V17, V18 and V19. Check waveform at W15.

| If Satisfactory | If Unsatisfactory |
|---|---|
| Check C105, C106, C103, C108, T3, yoke and other associated components. | Check C97, C98, C101, C102, L44 and other associated components. |

**DRIVE LINES**

Substitute V18 and V19. Check adjustment of horizontal drive trimmer (B2). Check C105, C109, C106, T3, yoke and other associated circuit components.

**COMPRESSED LEFT SIDE**

Check by substitution V17, V18 and V19. Check horizontal drive adjustment (B2) and width adjustment (B5). Check T3, yoke, C103 and other associated components.

**FOLDS**

Substitute V18 and V19. Check C103, C105, T3, yoke and other components associated with V18 and V19.

**XMAS TREE EFFECT**

Substitute V17. Check L44, C97, C98 and other components associated with the horizontal oscillator stage.

### VERTICAL

**LOSS OF SWEEP**

Check by substitution V15 and V16. Check waveform at W9.

| If Satisfactory | If Unsatisfactory |
|---|---|
| Check T4, yoke and other associated circuit components. | Check C89, C90, T2, C88, and other components associated with V15. |

**INSUFFICIENT SWEEP**

Check by substitution V15 and V16. Check adjustments of vertical linearity and height controls. Proceed as outlined under "Loss of Sweep".

**COMPRESSED AT BOTTOM**

Check by substitution V15 and V16. Check waveform at W9.

| If Satisfactory | If Unsatisfactory |
|---|---|
| Check C4, C5, T4, yoke and other associated circuit components. | Check C89, C90, T2 and other associated components. |

**COMPRESSED AT TOP**

Check by substitution V15 and V16. Check adjustment of vertical linearity and height controls. Check C90 for leakage.

**FOLDS**

Substitute V15 and V16. Check components associated with these stages.

## SYNC

### HORIZONTAL

**LOSS OF SYNC**

Substitute V17 and V14. Check horizontal frequency adjustment (B3), horizontal waveform adjustment (B4), and horizontal locking range adjustment (B1). Check C92, C93 and other components associated with these stages.

**CRITICAL HOLD**

Substitute V17 and V14. Check C94, C95, C96, L44, C97, C98 and other associated circuit components.

**PULLING PICTURE**

Substitute V17 and V14. Check C94, C95, C96, C97, C98 and other components associated with the horizontal AFC circuit.

### VERTICAL

**LOSS OF SYNC**

Check by substitution V15 and V16. Check vertical integrator network, C84, T2 and other associated circuit components.

**CRITICAL HOLD**

Substitute V15 and V16. Check C84, C85, R68, T2, vertical integrator network and other associated circuit components.

**TRIGGERING**

Check by substitution V14, V15 and V16. Check circuit near these stages for filament lead dress. Check noise balance control and circuit.

## VIDEO

**LOSS OF VIDEO**

Check C65, picture tube and components associated with picture tube.

**SOUND BARS**

Check adjustment of local oscillator. Check 4.5MC Trap adjustment (A12). Check video IF alignment.

**POOR RESOLUTION**

Check by substitution V2, V3, V4, V5, V6 and V7. Check video IF alignment. Check components associated with the video IF especially all bypass capacitors. Check bypass capacitors associated with V8.

**POOR CONTRAST**

Check by substitution V7 and V8. Check components associated with these stages.

**SMEAR**

Check by substitution V7 and V8. Check L40 for open. Check C61, C65 and C68. Check R40, R41, R42 and R46 for change of value. Check picture tube.

**ONE WIDE BLACK BAR ACROSS PICTURE**

Check tuner, video IF, video detector and video amplifier tubes for heater to cathode leakage.

## AUDIO

**WEAK OR NO SOUND**

Check by substitution V10, V11, V12 and V13. Check stages of V12 and V13 using audio signal generator.

| If Satisfactory | If Unsatisfactory |
|---|---|
| Check audio IF and ratio detector alignment. Check associated circuit componets. | Check components associated with V12 and V13 especially coupling and bypass capacitors. |

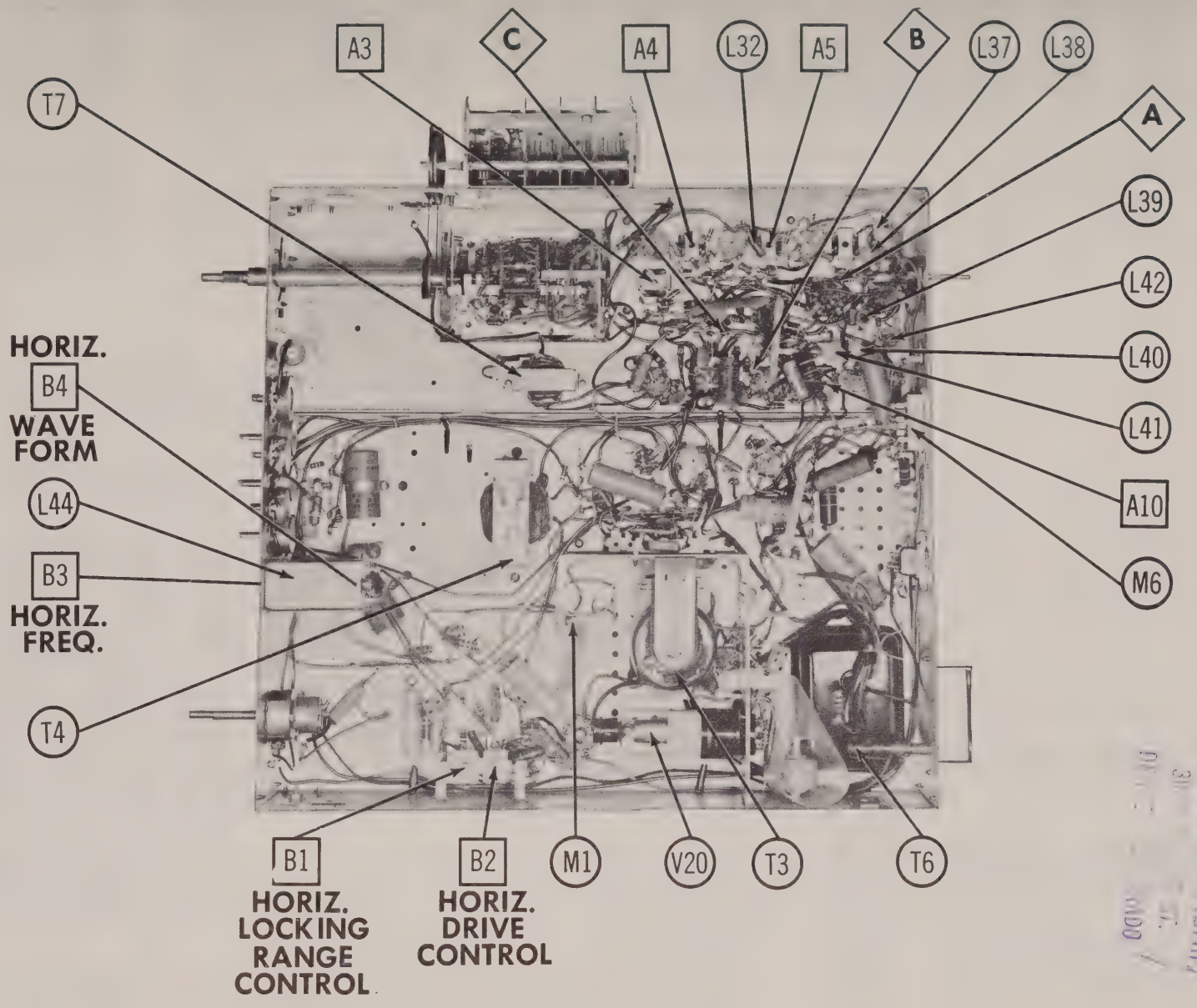
**BUZZ**

Realign, ratio detector. If buzz is still objectionable, substitute V11 and readjust A10 and A11.

**DISTORTED**

Check by substitution V10, V11, V12 and V13. Check stages of V12 and V13 for distortion using audio signal generator and scope.

| If Distorted | If Undistorted |
|---|---|
| Check components associated with the stage where distortion occurs. | Check audio IF and ratio detector alignment and components. |




CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

# PARTS LIST AND DESCRIPTIONS

## TUBES (SYLVANIA, GENERAL ELECTRIC or Equivalent)

| ITEM No | USE | REPLACEMENT DATA: Pacific-Mercury PART No | STANDARD REPLACEMENT | RTMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| V1 | UHF Oscillator | 6J6 | 6J6 | 7BF | |
| V2 | RF Amplifier | 6BQ7A | 6BQ7A | 9AJ | |
| V3 | Converter | 6X8 | 6X8 | 9AK | |
| V4 | 1st. Video IF Amp. | 6CB6 | 6CB6 | 7CM | |
| V5 | 2nd. Video IF Amp. | 6CB6 | 6CB6 | 7CM | |
| V6 | 3rd. Video IF Amp. | 6CB6 | 6CB6 | 7CM | |
| V7 | Video Detector-Noise Balance | 12AX7 | 12AX7 | 9A | |
| V8 | Video Output | 6CB6 | 6CB6 | 7CM | |
| V9 | AGC Keying | 6AU6 | 6AU6 | 7BK | |
| V10 | Sound IF Amp. | 6AU6 | 6AU6 | 7BK | |
| V11 | Ratio Detector | 6AL5 | 6AL5 | 6BT | |
| V12 | AF Amplifier | 6AV6 | 6AV6 | 7BT | |
| V13 | Audio Output | 6AQ5 | 6AQ5 | 7BZ | |
| V14 | Sync Separator | 12AU7 | 12AU7 | 9A | |
| V15 | Vert. Oscillator-Noise Balance Rectifier | 6AV6 | 6AV6 | 7BT | |
| V16 | Vert. Output | 12BH7 | 12BH7 | 9A | |
| V17 | Horiz. AFC-Horiz.Oscillator | 6SN7GT | 6SN7GT | 8BD | |
| V18 | Horiz.Output | 6AU5GT | 6AU5GT | 6CK | |
| V19 | Damper | 5W4GT | 5W4GT | 4CG | |
| V20 | HV Rectifier | 1B3GT | 1B3GT | 3C | |
| V21 | LV Rectifier | 5U4G | 5U4G | 5T | |

## CATHODE-RAY TUBE

| ITEM No | REPLACEMENT DATA: Pacific-Mercury PART No | SYLVANIA PART No | GENERAL ELECTRIC PART No | RTMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| Y22 | 21MP4 | 21MP4 | 21MP4 | 12C | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING: CAP. | VOLT | REPLACEMENT DATA: Pacific-Mercury PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C1A | ▲80 | 450 | PMA-42000 | AFH2-82 | | B047 | | FP245 | TVL-2778 | |
| B | ▲10 | 400 | | | | | | | | |
| C2A | ▲40 | 450 | PMA-42001 | AFH4-93 | | C035 | | FP240 | R1297 | |
| B | ▲80 | 350 | | | | | | †TC78 | | |
| C | ▲80 | 300 | | | | | | | | |
| C3 | 20 | 300 | PMA-42006 | BR3025A | | | | TC65 | TVA-1608 | |
| C4 | 100 | 50 | PMA-42005 | BR350/100 | | BRH501 | | TC3501 | TVA-1310 | |
| C5 | 30 | 300 | PMA-42006 | BR3050A | | BR3035A | | TC66 | TVA-1608 | |
| C6 | 1 | 50 | PMA-42002 | PRS150/4 | | BBR-1-50T | | TC31 | TVA-1300 | |
| C7 | 10 | | | BPD-0008 | D8-100 | | GP1K-100 | UC-541 | 5GA-Q1 | |
| C8 | 4.7 | | | | | | | | | |
| C9 | 4.7 | | | | | | | | | |
| C10 | 47 | | | | | | | | | |
| C11 | 800 | | | BPD-0008 | DD-801 | TM5T8 | 801-001 | DC-521 | 5HK-D1 | |
| C12 | 800 | | | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C13 | 800 | | | CN-1-001 | MFT-1000 | | | | 503C-D1 | |
| C14 | 39 | | | SI39NP0 | TCZ-39 | | NP0K-390 | | 5TCC-Q39 | |
| C15 | 10 | | | SI10NP0 | TCZ-10 | | NP0K-100 | ZT-541 | 5TCC-Q1 | |
| C16 | 5 | | | SI5NP0 | TCZ-4.7 | | NP0K-050 | ZT-555 | 5TCCB-V47 | |
| C17 | 110 | | | | | | | | | |
| C18 | 15 | | | SI15 | D8-150 | | GP1K-150 | UC-5415 | 5GA-Q15 | |
| C19 | 3 | | | SI3NP0 | TCZ-3.3 | | NP0K-030 | ZT-5533 | 5TCCB-V33 | |
| C20 | 800 | | | BPD-0008 | DD-801 | TM5T8 | 801-001 | DC-521 | 5HK-D1 | |
| C21 | 800 | | | BPD-0008 | DD-801 | TM5T8 | 801-001 | DC-521 | 5HK-D1 | |
| C22 | 470 | | | SI470 | D8-471 | | GP2K-471 | UC-5347 | 5GA-T47 | |
| C23 | 470 | | | SI470 | D8-471 | | GP2K-471 | UC-5347 | 5GA-T47 | |
| C24 | 1000 | | | BPD-001 | DD-102 | TM5D1 | 801-001 | DC-521 | 5HK-D1 | |
| C25 | .3 | | | | | | | | | |
| C26 | .36 | | | | | | | | | |
| C27 | .7 | | | | | | | | | |
| C28 | 15 | | | SI15 | D8-150 | | GP1K-150 | UC-5415 | 5GA-Q15 | |
| C29 | .75 | | | | | | | | | |
| C30 | 1.7 | | | | | | | | | |
| C31 | 15 | | | | | | | | | |
| C32 | 10 | | | | | | | | | |
| C33 | 1.5 | | | SIL5NP0 | TCZ-1.5 | | NP0K-1R5 | ZT-5515 | 5TCCB-V15 | |
| C34 | 1000 | | | BPD-001 | DD-102 | TM5D1 | 801-001 | DC-521 | 5HK-D1 | |
| C35 | 1000 | | | BPD-001 | DD-102 | TM5D1 | 801-001 | DC-521 | 5HK-D1 | |
| C36 | 1000 | | | BPD-001 | DD-102 | TM5D1 | 801-001 | DC-521 | 5HK-D1 | |
| C37 | 1000 | | | BPD-001 | DD-102 | TM5D1 | 801-001 | DC-521 | 5HK-D1 | |
| C38 | 10 | | | SI10NP0 | TCZ-10 | | NP0K-100 | ZT-541 | 5TCC-Q1 | |
| C39 | 110 | | | | | | | | | |
| C40 | .75 | | | | | | | | | |
| C41 | 1000 | | | BPD-001 | DD-102 | TM5D5 | 801-001 | DC-521 | 5HK-D1 | |
| C42 | 12 | | | SI12NP0 | TCZ-12 | | NP0K-120 | | 5TCC-Q12 | |
| C43 | 1500 | | PMB-40518-24 | SI1500 | D8-153 | TM5D15 | GP2L-152 | UC-5215 | 5HK-D15 | |
| C44 | 1500 | | PMB-40518-24 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C45 | 1500 | | PMB-40518-24 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C46 | 620 | | PMB-40521-42 | | | | | | | |
| C47 | 1500 | | PMB-40518-24 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C48 | 1500 | | PMB-40518-24 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C49 | 620 | | PMB-40521-42 | | | | | | | |
| C50 | 1500 | | PMB-40518-24 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C51 | 1500 | | PMB-40518-24 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C52 | 620 | | PMB-40521-42 | | | | | | | |
| C53 | 1500 | | PMB-40518-24 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C54 | 1500 | | PMB-40518-24 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C55 | 1500 | | PMB-40518-24 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C56 | 1500 | | PMB-40518-24 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C57 | 220 | | PMB-40518-19 | SI220 | D8-221 | | GP2K-221 | UC-5322 | 5GA-T22 | |
| C58 | 1500 | | PMB-40517-2 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C59 | 1500 | | PMB-40517-2 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C60 | 5 | | PMB-40518-1 | SI5NP0 | TCZ-4.7 | | NP0K-050 | ZT-555 | 5TCCB-V47 | |
| C61 | 5000 | | PMB-40517-3 | BPD-005 | MD-502 | TM5D5 | SL-005 | DC-525 | 5HK-D5 | |
| C62 | 220 | | PMB-40518-19 | SI220 | D6-221 | | GP2K-221 | UC-5322 | 5GA-T22 | |

Note 1. Some Models use 56MMF in this application.
Note 2. Not used in all Models.
Note 3. Used in Models having cascode tuner.
◆ Items C78A, C78B, C79C, R58A, R58B are combined in one unit.
When replacing item separately C79B and C79C should total 250MMF.
† Items C83A, C83B, C83C, R67A, R67B, R67C are combined in one unit.

## CAPACITORS (CONT.)

| ITEM No. | RATING: CAP. | VOLT | REPLACEMENT DATA: Pacific-Mercury PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL DUBILIER PART No. | ERIE PART No | MALLORY PART No | SPRAGUE PART No | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C63 | 100 | | | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | |
| C64 | 47 | | | SI47NP0 | TCZ-47 | | NP0K-470 | ZT-5547 | 5TCC-Q47 | Note 1 |
| C65 | .1 | 600 | PMB-41007-51 | P688-1 | | DF-104 | PTE6P1 | | PT601 | |
| C66 | .05 | 400 | PMB-41007-30 | P488-05 | | DF-503 | PTE485 | | PT415 | 4TM-S5 |
| C67 | 330 | 1500 | PMA-40008-1 | HVD15-00023 | | | | | MCE332 | 30GA-T32 |
| C68 | .02 | 400 | PMB-41007-74 | P488-02 | | DF-203 | PTE482 | | PT412 | 4TM-S2 |
| C69 | .5 | 100 | PMB-41007-17 | P185-5 | | | PJ2P5 | | PT405 | 2TM-P5 |
| C70 | 2 | | PMB-40519-3 | SI2.2NP0 | TCZ-2.2 | | | NP0K-2R2 | ZT-5522 | 5TCCB-V22 |
| C71 | 47 | 500 | | 1459-00005 | | | 5R5Q5 | | MCB225 | MS-45 |
| C72 | 1500 | | PMB-40518-24 | SI1500 | D8-152 | TM5D15 | GP2L-152 | | UC-5215 | 5HK-D15 |
| C73 | 1500 | | PMA-40517-2 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | | DC-5215 | 5HK-D15 |
| C74A | 1500 | | PMA-40517-4 | BPD-2X0015 | DD-2-152 | TM5DD15 | 812-0015 | | DCD-5215 | 5HK-3D15 |
| B | 1500 | | | | | | | | | |
| C75 | 1500 | | PMA-40517-2 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | | DC-5215 | 5HK-D15 |
| C76 | 5000 | | PMB-40518-32 | BPD-005 | MD-502 | TM5D5 | SL-005 | | DC-525 | 5HK-D5 |
| C77 | .01 | 200 | PMB-41006-7 | P488-01 | | D6-103 | PTE481 | GP2-333-103 | PT411 | 4TM-S1 |
| C78 | 5000 | | PMA-40517-3 | BPD-008 | MD-502 | TM5D5 | SL-006 | | DC-525 | 5HK-D5 |
| C79A | .006 | | | | | | | | | |
| B | 350 | | ◆PMA-95001 | | ◆PC-70 | | ◆1406-01 | | ◆ 104C4 | |
| C | .006 | | | | | | | | | |
| C80 | .01 | 600 | PMB-41006-45 | P688-01 | | D6-103 | PTE681 | GP2-333-103 | PT611 | 6TM-S1 |
| C81 | .022 | 600 | PMB-41007-74 | P688-022 | | DF-203 | PTE5822 | | PT6122 | 6TM-S22 |
| C82 | 150 | | PMB-40518-17 | SU150 | | D6-151 | TM5T15 | GP2K-151 | UC-5315 | 5GA-T15 |
| C83A | .002 | | | P688-002 | | | PTE6D2 | | PT623 | |
| B | .005 | | †PMA-95000 | P688-005 | | †PC-100 | PTE6D5 | †1405-01 | PT625 | †10IC1 |
| C | .005 | | | P688-005 | | | PTE6D5 | | PT625 | |
| C84 | 4700 | 500 | PMB-40003-63 | 1464-005 | | | 1DR5D6 | | MCB465 | MS-25 |
| C85 | 1500 | | PMA-40517-2 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | | DC-5215 | 5HK-D15 |
| C86 | 1500 | | PMB-40518-24 | SU1500 | D6-152 | TM5D15 | GP2L-152 | | UC-5215 | 5HK-D15 |
| C87 | 470 | | PMA-40518-24 | SU470 | D6-471 | | GP2K-471 | | UC-5347 | 5GA-T47 |
| C88 | 1500 | | PMB-40518-24 | SU1500 | D6-152 | TM5D15 | GP2L-152 | | UC-5215 | 5HK-D15 |
| C89 | .05 | 600 | PMB-41006-49 | P688-05 | | DF-503 | PTE685 | | PT615 | 6TM-S5 |
| C90 | .1 | 600 | PMB-41006-51 | P688-1 | | DF-104 | PTE6P1 | | PT601 | 6TM-P1 |
| C91 | 47 | 500 | PMB-40003-15 | 1469-00005 | | | 5R5Q5 | | MCB225 | MS-45 |
| C92 | 180 | 500 | PMB-40003-29 | | | | | | | |
| C93 | 2200 | 500 | PMB-40003-55 | | | | | | | |
| C94 | .05 | 400 | PMB-41006-30 | P488-05 | | DF-503 | PTE485 | | PT415 | 4TM-S5 |
| C95 | .02 | 400 | PMB-41006-28 | P488-02 | | DF-203 | PTE482 | | PT412 | 4TM-S2 |
| C96 | .25 | 200 | PMB-41006-75 | P488-25 | | | PJ2P25 | | PT4025 | 2TM-P25 |
| C97 | 390 | 500 | PMB-40003-37 | 1469-0004 | | | 5R5T4 | | MCB243 | MS-34 |
| C98 | .01 | 400 | PMA-41009 | P488-01 | | D6-103 | PTE4S1 | GP2-333-103 | PT411 | 4TM-S1 |
| C99 | 100 | | PMB-40518-14 | SU100 | | D6-101 | TM5T1 | GP1K-101 | UC-531 | 5GA-T1 |
| C100 | 47 | 500 | PMB-40003-15 | 1469-00005 | | | 5R5Q5 | | MCB225 | MS-45 |
| C101 | 1000 | 500 | PMB-40003-47 | 1479-001 | | | 2R5D1 | | MCB255 | MS-51 |
| C102 | .001 | 600 | PMB-41006-39 | P688-001 | | D6-102 | PTE6D1 | GP2L-102 | PT621 | 6TM-D1 |
| C103 | .025 | 500 | PMB-41006-47 | P688-025 | | | PTE622 | | PT6122 | 6TM-S22 |
| C104 | .25 | 200 | PMB-41006-15 | P488-25 | | | PJ2P25 | | PT4025 | 2TM-P25 |
| C105 | .033 | 200 | PMB-41007-75 | P488-033 | | | | | | |
| C106 | 100 | 2000 | PMA-40523-23 | HVD30-0001 | | | | | | 30GA-T1 |
| C107 | 500 | 30000 | PMA-40004 | HV20C | TV3-502 | MM-C20T6 | 413-501 | | HV20035A | 20DD-T5 |
| C108 | .25 | 200 | PMB-41007-53 | 684-25 | | PTE6P25 | | | PT6025 | 6TM-P25 |
| C109 | 47 | 1000 | PMB-40002-15 | | | | | | | |
| C110 | 1500 | | PMB-40518-24 | | | | | | | Note 2 |
| C111 | 1500 | | PMB-40518-24 | BPD-0015 | DD-152 | TM5D15 | 801-0015 | DC-5215 | 5HK-D15 | Note 3 |

## CONTROLS

| ITEM No. | RATING: RESISTANCE | WATTS | REPLACEMENT DATA: Pacific-Mercury PART No. | IRC PART No. | CLAROSTAT PART No | CENTRALAB PART No | MALLORY PART No | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 750Ω | 2 | PMB-48015 | Q7-415 * | RTV-382 | | WF751 | Contrast-wire wound-panel |
| B | 500KΩ | ½ | | | | | UN55A | Volume-rear |
| C | Switch | | | | | | US-26 | Attach to R1B |
| R2A | 50KΩ | ½ | PMB-48014-1 | QU1-123 | AG-44-S | AB-31 | U-35 | Horiz. Lock |
| B | Shaft | | Not Req. | Not Req. | KSS-3 | AK-1 | Not Req. | Attach to R2A |
| R3A | 250KΩ | ½ | PMB-48014-3 | QU1-130 | AG-55-S | AB-50 | SU-46 | Noise Balance |
| B | Shaft | | Not Req. | SQ | FKD-1/4 | AK-1 | Not Req. | Attach to R3A |
| R4A | 100KΩ | ½ | PMB-48014-2 | QU1-128 | AG-49-S | AB-40 | U-41 | Brightness |
| B | Shaft | | Not Req. | Not Req. | KSS-3 | AK-1 | Not Req. | Attach to R4A |
| R5A | 2.5Meg | ½ | PMB-48014-5 | QU1-339 | AG-64-S | AB-83 | SU-565 | Height |
| B | Shaft | | Not Req. | SQ | FKS-1/4 | AK-1 | Not Req. | Attach to R5A |
| R6A | 1.5Meg | ½ | PMB-48014-7 | QU1-138 | AG-83-S | AB-75 | U-155 | Vert. Lock |
| B | Shaft | | Not Req. | Not Req. | KSS-3 | AK-1 | Not Req. | Attach to R6A |
| R7A | 5000Ω | ½ | PMA-48018 | QU1-114 | AG-18-S | AB-10 | SU-14 | Vert. Linearity |
| B | Shaft | | Not Req. | SQ | FKS-1/4 | AK-1 | Not Req. | Attach to R7A |

* CONCENTRIKIT EQUVALENT-KIT K-3, BASE ELEMENTS & SHAFT W1I-105 & P3-1I4 (Panel) B1B-133 & R1-205 (Rear) & 3TVCC-76-1.
† UNIVERSAL REPLACEMENT-(MALLORY EXACT DUPLICATE PART NO UE2WS).

## RESISTORS

| ITEM No. | RATING: OHMS | WATT | REPLACEMENT DATA: Pacific-Mercury PART No. | IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R8 | 47Ω | ½ | | | |
| R9 | 270Ω | ½ | | BTS-270 | |
| R10 | 10KΩ | ½ | | | |
| R11 | 470Ω | ½ | | BTS-10K | |
| R12 | 4700Ω | ½ | | BTS-4700 | |
| R13 | 1Meg 5% | ½ | | | |
| R14 | 750KΩ 5% | ½ | | | |
| R15 | 1000Ω | ½ | | BTS-1000 | |
| R16 | 3900Ω | ½ | | BTS-3900 | |
| R17 | 470Ω | ½ | | BTS-470 | |
| R18 | 220KΩ | ½ | | BTS-220K | |
| R19 | 2200Ω | ½ | | BTS-2200 | |
| R20 | 2200Ω | ½ | | BTS-2200 | |
| R21 | 1000Ω | ½ | | BTS-1000 | |
| R22 | 15KΩ | ½ | | BTS-15K | |
| R23 | 220Ω | ½ | | BTS-220 | |
| R24 | 4700Ω | ½ | | BTS-4700 | |
| R25 | 330Ω | ½ | PMA-45015-19 | BTS-330 | |
| R26 | 330Ω | ½ | PMA-45015-19 | BTS-330 | |
| R27 | 150Ω | ½ | PMA-45015-15 | BTS-150 | |
| R28 | 47Ω | ½ | PMA-45015-9 | BTS-47 | |
| R29 | 1000Ω | ½ | PMA-45015-25 | BTS-1000 | |
| R30 | 47Ω | ½ | PMA-45015-9 | BTS-47 | |
| R31 | 1000Ω | ½ | PMA-45015-25 | BTS-1000 | |
| R32 | 150Ω | ½ | PMA-45015-15 | BTS-150 | |
| R33 | 330Ω | ½ | PMA-45015-19 | BTS-330 | |
| R34 | 220KΩ | ½ | PMA-45015-53 | BTS-220K | |
| R35 | 100KΩ | ½ | PMA-45015-49 | BTS-100K | |
| R36 | 27KΩ | ½ | PMA-45015-42 | BTS-27K | |
| R37 | 4700Ω | ½ | PMA-45015-33 | BTS-4700 | |
| R38 | 1Meg | ½ | PMA-45015-61 | BTS-1Meg | |
| R39 | 2200Ω | ½ | PMA-45015-29 | BTS-2200 | |

## RESISTORS (CONT.)

| ITEM No. | RATING: OHMS | WATT | REPLACEMENT DATA: Pacific-Mercury PART No. | IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R40 | 100KΩ | ½ | PMA-45015-49 | BTS-100K | |
| R41 | 5800Ω | 2 | PMA-45018-35 | BTS-5800 | |
| R42 | 39KΩ | ½ | PMA-45015-44 | BTS-39K | |
| R43 | 100KΩ | ½ | PMA-45015-49 | BTS-100K | |
| R44 | 10KΩ | ½ | PMA-45015-37 | BTS-10K | |
| R45 | 270KΩ | ½ | PMA-45015-54 | BTS-270K | |
| R46 | 39KΩ | ½ | PMA-45015-44 | BTS-39K | |
| R47 | 390KΩ | ½ | PMA-45015-56 | BTS-390K | |
| R48 | 100KΩ | ½ | PMA-45015-49 | BTS-100K | |
| R49 | 100KΩ | ½ | PMA-45015-49 | BTS-100K | |
| R50 | 82Ω | ½ | PMA-45015-23 | BTS-82 | |
| R51 | 1000Ω | ½ | PMA-45015-25 | BTS-1000 | |
| R52 | 270Ω | ½ | PMA-45015-18 | BTS-270 | |
| R53 | 47KΩ | ½ | PMA-45015-45 | BTS-47K | |
| R54 | 10KΩ | ½ | PMA-45015-37 | BTS-10K | |
| R55 | 10KΩ | ½ | PMA-45015-37 | BTS-10K | |
| R56 | 1Meg | ½ | PMA-45015-61 | BTS-1Meg | |
| R57 | 10Meg | ½ | PMA-45015-73 | BTS-10Meg | |
| R58A | 500KΩ | ½ | ◆PMA-95001 | | |
| B | 500KΩ | ½ | | | |
| R59 | 330Ω | 1 | PMA-15017-19 | BTA-330 | |
| R60 | 820Ω | 2 | PMA-45019-24 | BTB-820 | |
| R61 | 470KΩ | ½ | PMA-45015-57 | BTS-470K | |
| R62 | 4.7Meg | ½ | PMA-45015-69 | BTS-4.7Meg | |
| R63 | 470KΩ | ½ | PMA-45015-57 | BTS-470K | |
| R64 | 2700Ω | ½ | PMA-45015-30 | BTS-2700 | |
| R65 | 1800Ω | ½ | PMA-45015-26 | BTS-1800 | |
| R66 | 2300Ω | ½ | PMA-45015-29 | BTS-2300 | |
| R67A | 22KΩ | ½ | | BTS-22K | |
| B | 8200Ω | ½ | †PMA-95000 | BTS-8200 | |
| C | 8200Ω | ½ | | BTS-8200 | |
| R68 | 820KΩ | ½ | PMA-45015-60 | BTS-820K | |
| R69 | 150KΩ | ½ | PMA-45015-53 | BTS-150K | |
| R70 | 270KΩ | ½ | PMA-45015-54 | BTS-270K | |
| R71 | 47KΩ | ½ | PMA-45015-45 | BTS-47K | |
| R72 | 8200Ω | ½ | PMA-45015-36 | BTS-8200 | |
| R73 | 2200Ω | ½ | PMA-45015-29 | BTS-2200 | |
| R74 | 1Meg | ½ | PMA-45015-61 | BTS-1Meg | |
| R75 | 470Ω | ½ | PMA-45015-21 | BTS-470 | |
| R76 | 47Ω | ½ | PMA-45015-9 | BTS-47 | |
| R77 | 560Ω | ½ | PMA-45015-22 | BTS-560 | |
| R78 | 560Ω | ½ | PMA-45015-22 | BTS-560 | |
| R79 | 10000Ω | ½ | PMA-45015-26 | BTS-1000 | |
| R80 | 68KΩ | ½ | PMA-45017-47 | BTA-68K | |
| R81 | 120KΩ | 1 | PMA-45017-50 | BTA-120K | |
| R82 | 820KΩ | ½ | PMA-45015-60 | BTS-820K | |
| R83 | 8200Ω | ½ | PMA-45015-36 | BTS-8200 | |
| R84 | 150KΩ | 1 | PMA-45017-51 | BTA-150K | |
| R85 | 150KΩ | 1 | PMA-45017-51 | BTA-150K | |
| R86 | 2.7Meg 5% | 1 | PMA-45017-66 | BTA-2.7Meg 5% | |
| R87 | 10KΩ | ½ | PMA-45015-37 | BTS-10K | |
| R88 | 100KΩ | 1 | PMA-45017-49 | BTA-100K | |
| R89 | 8200Ω | ½ | PMA-45015-36 | BTS-8200 | |
| R90 | 68KΩ | 1 | PMA-45017-47 | BTA-68K | |
| R91 | 150KΩ | ½ | PMA-45015-51 | BTS-150K | |
| R92 | 100KΩ | ½ | PMA-45015-49 | BTS-100K | |
| R93 | 470KΩ | ½ | PMA-45015-57 | BTS-470K | |
| R94 | 150Ω | 1 | PMA-45015-15 | Note | |
| R95 | 220Ω | 6 | PMB-47007-3 | | |
| R96 | 6800Ω | 2 | PMA-45019-35 | BTB-6800 | |
| R97 | 1000Ω | 1 | PMA-45017-25 | BTA-1000 | |
| R98 | 3.3Ω | ½ | PMA-45013-1 | | |
| R99 | 470KΩ | 1 | PMA-45017-57 | | |
| R100 | 50Ω | 6 | PMB-47007-4 | | |
| R101 | 8200Ω | 15 | PMB-47007-5 | 2D-250 | |
| R102 | 1000Ω | 7.5 | PMB-47007-1 | 1 3/4A-1000 | |
| R103 | 1000Ω | 7.5 | PMB-47007-1 | 1 3/4A-1000 | |
| R104 | 27KΩ | 1 | PMA-45017-42 | BTA-27K | |
| R105 | 220KΩ | ½ | PMA-45015-53 | BTS-220K | |
| R106 | 47KΩ | ½ | PMA-45015-45 | BTS-47K | Note |

Note. Not used in all Models.
◆ Items R58A, R58B, C79A, C79B, C79C are combined in one unit.
† Items R67A, R67B, R67C, C83A, C83B, C83C are combined in one unit.

## TRANSFORMER (POWER)

| ITEM No | RATING: PRI | SEC 1 | SEC 2 | SEC 3 | REPLACEMENT DATA: Pacific-Mercury PART No | STANCOR PART No. | MERIT PART No. | CHICAGO PART No | TRIAD PART No. | RCA TYPE No. |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 117VAC @ 1.9A | 700VCT @ .220ADC | 5VAC @ 3A | 6.3VAC @ 2A | PMB-50003 | | | | | |
| | | | SEC 4 | SEC 5 | | | | | | |
| | | | 6.3VAC @1.2A | 6.3VAC @6.9A | | | | | | |

## TRANSFORMER (SWEEP CIRCUITS)

| ITEM No. | RATING: DC RESISTANCE PRI. | SEC. | REPLACEMENT DATA: Pacific-Mercury PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. | RCA TYPE No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| T2 | 180Ω | 1000Ω | PMA56005-2 PMA56005 ① | A-8111 | A-3000 | TSO-5 ② | A-9TX ④ | 206T2 ⑤ | Vert. Osc.Trans. |
| T3 | 440Ωtap ⑥ 20Ω | 350 tap ⑥ 40Ω, 1.7Ω, 31.7Ω | PMC-56002 | | HVO-9 ③ | TFB-18 | D-19 ④ | 225T1 | Horiz. Output Trans. |
| | | SEC. 2 0Ω | | | | | | | |
| T4 | 1500Ω | tap ⑥ 5Ω | PMA-56004 | A-8141 | A-3039 | TSO-12 | A-104X | 226T1 | Vert. Output Trans. |
| T5A | 24Ω | | PMA-56009 | DY-9A ⑤ | MDF-72 | TT-3 ⑤ | Y-1T | 21ID2 | Horiz. Deflection Coils |
| B | 45Ω | | | | | | | | Vert. Deflection Coils |
| T6 | 8Ω | | PMA-56003 | | MWC-6 | TW-7 | WC-12 ⑦ | 20IR1 | Width Coil |

① Alternate vert. osc. trans.
② Drill one new mounting hole.
③ Do not connect terminal 7 to terminal 8.
④ Wire as in original circuit, except, no connection to terminal "T"
⑤ Use original horiz. deflection coil network, if necessary.
⑥ Use original deflection coil network.
⑦ Connect to coded blue and green terminals.
⑧ Mount on top of chassis.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING: IMPEDANCE PRI. | SEC. | DC RES. PRI. | SEC. | REPLACEMENT DATA: Pacific-Mercury PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| T7 | 7.5KΩ | 3.3Ω | 425Ω | .6Ω | PMB-51005 | A-3678 | A-2931 | RO-13 | S-9X | |

## SPEAKER

| ITEM No | RATINGS: SIZE | FIELD | V C IMP. | REPLACEMENT DATA: Pacific-Mercury PART No. | JENSEN PART No. | QUAM PART No. | NOTES |
|---|---|---|---|---|---|---|---|
| SP1 | 8" | PM | 3.3Ω | PMA-90019 | ST-118 Mod. P8-U | 8A21 | |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. PRI. | DC RES. SEC | REPLACEMENT DATA: Pacific-Mercury PART No. | MEISSNER PART No | MERIT PART No | MILLER PART No | NOTES |
|---|---|---|---|---|---|---|---|---|
| L1 | UHF Ant. Coupling | 0Ω | | | | | | |
| L2A | 1st. Pre-Selector RF Coil Primary | 0Ω | | | | | | |

# PARTS LIST AND DESCRIPTIONS (Continued)

## COILS (CONT.)

| ITEM No. | USE | DC RES. PRI. | DC RES. SEC. | REPLACEMENT DATA Pacific-Mercury PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|
| B | 1st. Pre-Selector RF Coil Secondary | 0Ω | | | | | | |
| L3A | 2nd. Pre-Selector RF Coil Primary | 0Ω | | | | | | |
| B | 2nd. Pre-Selector RF Coil Secondary | 0Ω | | | | | | |
| L4 | RF Coupling | 0Ω | | | | | | |
| L5 | Osc. Doubler Coupling | 0Ω | | | | | | |
| L6A | Osc. Doubler Primary | 0Ω | | | | | | |
| B | Osc. Doubler Secondary | 0Ω | | | | | | |
| L7 | Osc. Doubler Mixer Coupling | 0Ω | | | | | | |
| L8 | Osc. Tank Coil | 0Ω | | | | | | |
| L9 | Osc. Tank Coil Shunt | 0Ω | | | | | | |
| L10 | Osc. Coil | 0Ω | | | | | | |
| L11 | Fil. Choke | 0Ω | | | | | | |
| L12 | RF Choke | .1Ω | | | | | | |
| L13 | UHF IF Coil | 0Ω | 0Ω | | | | | |
| L14 | VHF Ant. Trans. | 0Ω CT | 0Ω CT | | | | | Low Channel Secondary -0Ω |
| L15 | Ant. C oils | 0Ω | | | | | | |
| L16 | UHF IF Coupling Coil | 0Ω | | | | | | |
| L17 | UHF IF Coupling Coil | 0Ω | | | | | | |
| L18 | Ant. Coil | 0Ω | | | | | | Channel 13 |
| L19 | Neutr. Coil | 0Ω | | | | | | |
| L20 | RF Coil | 0Ω | | | | | | Channel 13 |
| L21 | RF Coils | 0Ω | | | | | | |
| L22 | Mixer Grid Coil | 0Ω | | | | | | Channel 13 |
| L23 | Mixer Grid Coils | 0Ω | | | | | | |
| L24 | Osc. Plate Coil | 0Ω CT | | | | | | Channel 13 |
| L25 | Osc. Coils | 0Ω | | | | | | |
| L26 | Osc. Coil | 0Ω | | | | | | Channel 6 |
| L27 | Fil. Choke | 0Ω | | | | | | |
| L28 | Conv. Plate | 0Ω | | | | | | |
| L29 | 1st. Video IF | 0Ω | | PMB-52051 | | | | Includes trap, 1500MMF Cap., & 33KΩ resistor |
| L30 | Fil. Choke | 0Ω | | PMB-52053 | | | 4606 | 2.5 Microhenries (Not used in all Models) |
| L31 | 2nd. Video IF | .1Ω | .1Ω | PMB-52050 | | | 6232 † | Includes trap & 15KΩ resistor |
| L32 | Fil. Choke | 0Ω | | PMB-52053 | | | 4606 | 2.5 Microhenries |
| L33 | 3rd. Video IF | .1Ω | .1Ω | PMB-52049 | | | 6233† | Includes trap & 15KΩ resistor |
| L34 | Fil. Choke | 0Ω | | PMB-52053 | | | 4606 | 2.5 Microhenries (Not used in all Models) |
| L35 | 4th. Video IF | .1Ω | .1Ω | PMB-52052 | | | 6234 | |
| L36 | Fil. Choke | 0Ω | | PMB-52053 | | | 4606 | 2.5 Microhenries (Not used in all Models) |
| L37 | Series Peaking Coil | 4.6Ω | | PMA-52023 | 19-3093 | TV-181 | 4642 | 100 Microhenries |
| L38 | Shunt Peaking Coil | 11Ω | | PMA-52024 | 19-3500 | TV-188 | 4566 | 450 Microhenries |
| L39 | 4.5MC Trap | 2Ω | | PMA-52028-2 | 20-1004 | TV-151 | 1470 | Pacific-Mercury part number includes C64 |
| L40 | Series Peaking Coil | 7Ω | | PMA-52025 | 19-3180 * | TV-184 * | 6154 * | 200 Microhenries, wound on 22 KΩ resistor |
| L41 | Shunt Peaking Coil | 11Ω | | PMA-52024 | | | | 450 Microhenries |
| L42 | Sound IF | 2Ω | | PMA-52028-2 | 17-3400 | TV-151 | 1469 | Pacific-Mercury part number includes C71 |
| L43 | Ratio Det. | 3.4Ω | 1.3Ω CT | PMA-52027 | 17-3497 | TV-115 | 6205 | Tertiary Winding-.45Ω |
| L44 | Horiz. Osc. | 73Ω | | PMB-52019 | 20-1402 | TV-162 | 6183 | Primary tapped @ 50Ω, Horiz. waveform winding -46Ω |

* Parallel with 22KΩ resistor
† Add 15KΩ resistor externally.

## FUSES

| ITEM No. | TYPE | RATING | REPLACEMENT DATA Pacific-Mercury PART No. FUSE | Pacific-Mercury PART No. HOLDER | LITTELFUSE PART No. FUSE | LITTELFUSE PART No. HOLDER | BUSS PART No. FUSE | BUSS PART No. HOLDER |
|---|---|---|---|---|---|---|---|---|
| M1 | 3AG | 1/4Amp. 250V | | | 312.250 (3AG-1/4A) | 357001 | AGC-1/4 | 4405 |

## MISCELLANEOUS

| ITEM No. | PART NAME | Pacific-Mercury PART No. | NOTES |
|---|---|---|---|
| M2 | RF Tuner | | VHF |
| M3 | RF Tuner | | UHF |
| M4 | Crystal Diode | | Oscillator Generator (1N82) |
| M5 | Crystal Diode | | UHF Mixer (1N82) |
| M6 | Switch | | TV-Phono Selector |
| M7 | Centering Magnet | | |
| M8 | Ion Trap | | |
| B1, B2 | Trimmer Cap. (Dual) | | Horiz. Locking range, Horiz. Drive (25-280MMF, 80-480MMF) |

# TROUBLE SHOOTING AIDS (CONT)

PROPERTY OF
L. F. BLAN
DENV

## POWER

**SMALL RASTER WEAK SOUND**

Substitute V21. Check B+ filter capacitors and other components forming the B+ filter and decoupling networks.

**DIM PICTURE**

Substitute V21. Check B+ filter network for shorts and for leaky filter capacitors.

## HIGH VOLTAGE

**LOSS OF HIGH VOLTAGE**

Check by substitution V17, V18, V19 and V20. Check waveform at W15.

| If Satisfactory | If Unsatisfactory |
|---|---|
| Check T3, C107, C105, C103, C108, R98, R99, yoke and other associated circuit components. | Check C97, C98, C101, C102, L44 and other components associated with V17. |

**INSUFFICIENT HIGH VOLTAGE**

Check by substitution V17, V18, V19, V20 and V21. Proceed as outlined under "Loss of High Voltage".

**BLOOMING**

Check by substitution V18, V19, and V20. Check T3, R98, R99, C107, C103, yoke, picture tube and other associated circuit components.

## GENERAL

**RASTER SOUND NO PICTURE**

See "Loss of Video".

**RASTER SNOWY PICTURE POOR SOUND**

Check by substitution V2, V3, V4, V5, V6 and V7. In case UHF is used, check V1.

**TOTAL LOSS OF SYNC**

Check adjustment of noise balance control. Substitute V7, V14 and V15. components associated with these stages.

**INTERMITTENT STREAKS**

Check high voltage section for corona discharge and arcing.

**DEAD SET**

Check AC interlock assembly. Check switch on volume control. Check T1.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this receiving equipment.

# SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF Tuner Oscillator Circuit may accomplished by removing the Channel Selector and Fine Tuning knobs.

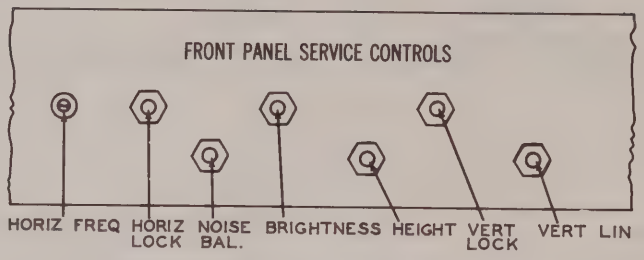
PICTURE TUBE SAFETY GLASS CLEANING

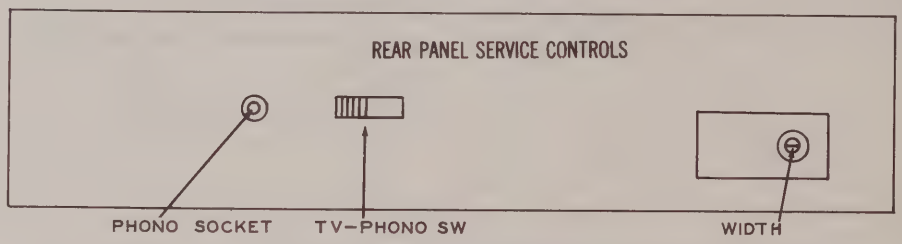
To clean safety glass remove three wood screws holding wood strip at the top of cabinet. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION




SPECIAL ADJUSTMENTS-NOISE BALANCE CONTROL

Tune to strongest TV signal available. Turn control fully clockwise, then counter-clockwise until picture starts to distort. Back off the adjustment enough to eliminate the distortion.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the Horiz. Oscillator Circuit can be made from the front panel service controls. Set the Horiz. Lock control to the mid-position of its range and adjust the Horiz. Freq. slug, L44, until the picture synchronizes horizontally. If synchronization cannot be obtained by the above adjustment see Horiz. Sweep Circuit Adjustments. on page 11.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector Buzz, adjust the Ratio Detector Secondary , L43, located on top of chassis. (See tube placement chart).

FUSES

One fuse is used for Horizontal Sweep Circuit protection.(For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

# DISASSEMBLY INSTRUCTIONS

Remove 5 push on type control knobs from front panel.

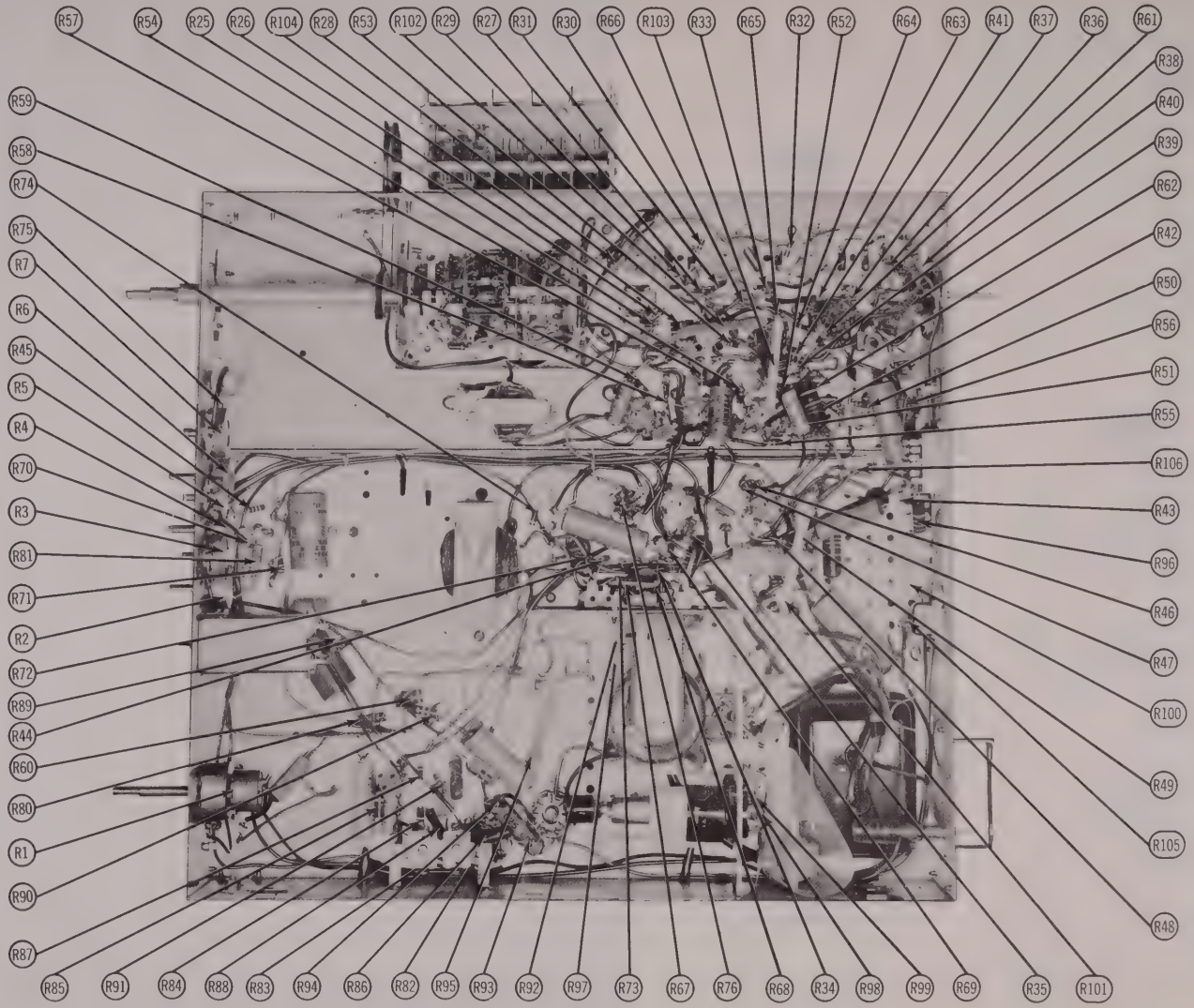
Remove 9 wood screws. Remove rear cover.

Disconnect built-in antenna.

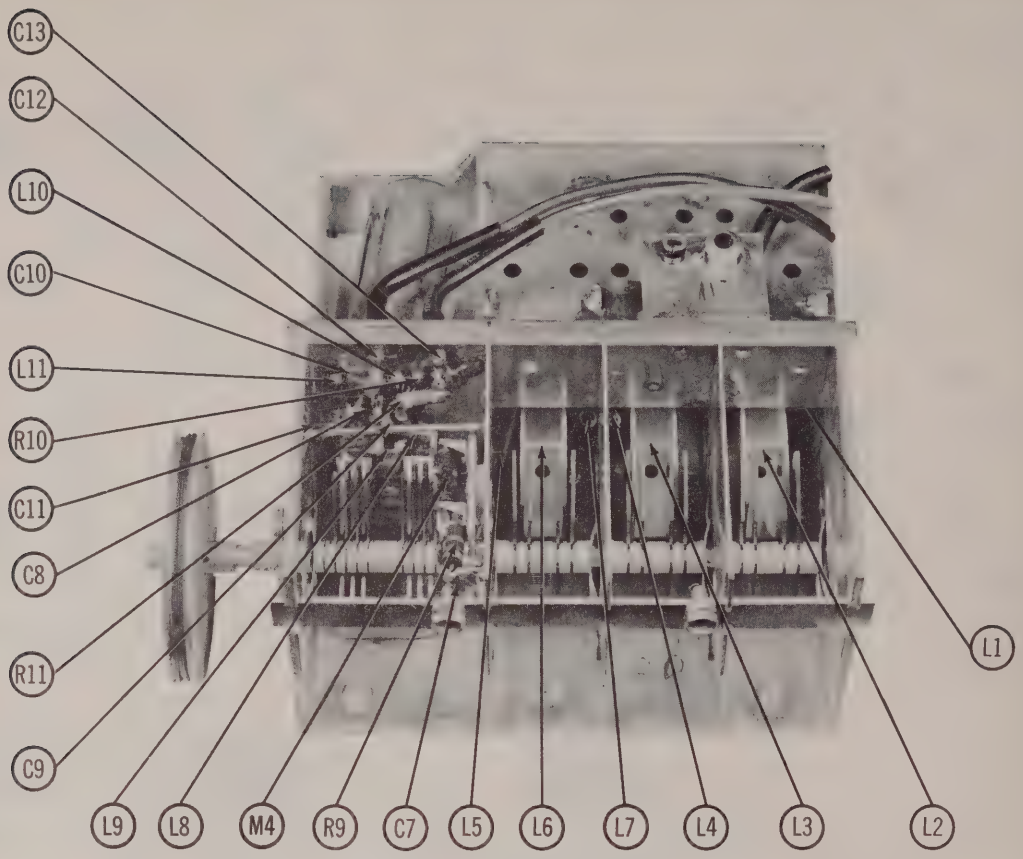
Remove 4 wood screws. Remove VHF & UHF antenna brackets.

Disconnect speaker. Remove 4 speaker nuts. Remove speaker.

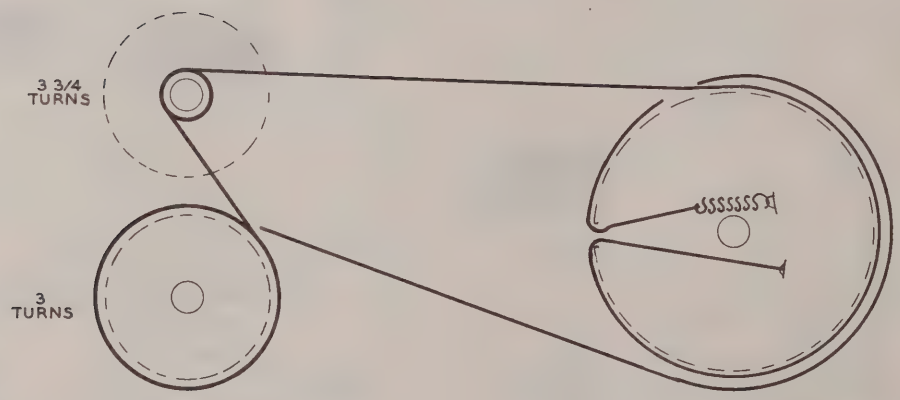
Remove 4 chassis bolts. Remove chassis.




CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION




UHF TUNER




UHF DRIVE CORD STRINGING

PROPERTY OF
L. F [illegible]

ROLAND
MODEL 6T1M

ROLAND
MODEL 6T1M

| | |
|---|---|
| TRADE NAME | Roland Model 6T1M |
| MANUFACTURER | Roland Radio Corp., 12-30 Anderson Ave., Mt. Vernon, N.Y. |
| TYPE SET | AC-DC Operated AM Superheterodyne Receiver |
| TUBES (Six) | Types 6BJ6 RF Amp., 12BE6 Conv., 6BJ6 IF Amp., 12AT6 Det-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier. |
| POWER SUPPLY | 110-120 Volts AC/DC RATING .22 Amp @ 117 Volts AC |
| TUNING RANGE—BROADCAST | 540-1620 KC |

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, If available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an unsulated alignment screwdriver for adjusting.
Turn tuning gang fully closed and set pointer 1 3/8" from left hand edge of dial back plate.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .1MFD | High side to stator lug, RF section of tuning gang. Low side to B-. | 455KC (400~Mod) | Tuning gang fully open. | Across voice coil. | A1, A2, A3, A4 | Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation. |
| 2. | " | " | 540KC | Tuning gang fully closed. | " | A5 | Preset A6, 3/4 turn from tight. Adjust A5 for maximum output. |
| 3. | " | " | 1620KC | Tuning gang fully open. | " | A6 | Adjust for maximum output. |
| 4. | | Loop | 1400KC | Tune to 1400KC signal. | " | A7, A8 | Fashion loop of several turns of wire and radiate signal into loop of receiver Adjust for maximum output. |

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"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

# PARTS LIST AND DESCRIPTIONS

ROLAND
MODEL 6T1M

## TUBES (SYLVANIA, GENERAL ELECTRIC or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA | | RTMA BASE TYPE | INSTALLATION NOTES |
|---|---|---|---|---|---|
| | | ROLAND PART No. | STANDARD REPLACEMENT | | |
| V1 | RF Amplifier | 6BJ6 | 6BJ6 | 7CM | |
| V2 | Converter | 12BE6 | 12BE6 | 7CH | |
| V3 | IF Amplifier | 6BJ6 | 6BJ6 | 7CM | |
| V4 | Det-AVC-AF Amp. | 12AT6 | 12AT6 | 7BT | |
| V5 | Audio Output | 50C5 | 50C5 | 7CV | |
| V6 | Rectifier | 35W4 | 35W4 | 5BQ | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | ROLAND PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C1A | 40 | 150 | | PRS150/50-30 -20 | | EDL44215 | | 3N532 | TVA-2445 TVA-1410 | Red |
| B | 40 | 150 | | | | | | | | Blue |
| C | 20 | 150 | | | | | | | | Yellow |
| C2 | 5000 | | | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | 5HK-D5 | |
| C3 | .05 | 400 | | P488-05 | DF-503 | PTE4S5 | | PT415 | 4TM-S5 | |
| C4 | 220 | 500 | | 1468-00025 | D6-221 | 5W5T25 | GP2K-221 | MC240 | 1FM-325 | |
| C5 | .01 | 600 | | P688-01 | D6-103 | PTE6S1 | GP2-333-103 | PT611 | 6TM-S1 | |
| C6 | 220 | 500 | | 1468-00025 | D6-221 | 5W5T25 | GP2K-221 | MC240 | 1FM-325 | |
| C7 | .01 | 600 | | P688-01 | D6-103 | PTE6S1 | GP2-333-103 | PT611 | 6TM-S1 | |
| C8 | .002 | 600 | | P688-002 | D6-202 | PTE6D2 | GP2-333-202 | PT622 | 6TM-D2 | |
| C9 | .01 | 600 | | P688-01 | D6-103 | PTE6S1 | GP2-333-103 | PT611 | 6TM-S1 | |
| C10 | .01 | 600 | | 689ZX-01 | | PJ6S1 | | PT611 | 6TM-S1 | |
| C11 | .1 | 400 | | P488-1 | | PT4P1 | | PT401 | 4TM-P1 | |

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | ROLAND PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | MALLORY PART No. | |
| R1A | 500KΩ | ½ | VCD-200S | QJ-457R* | | | UF55A | Volume-Panel |
| B | 500KΩ | | | | | | UR55L | Tone-Rear |
| C | Switch | | | | | | US-26 | Attach to R1B |

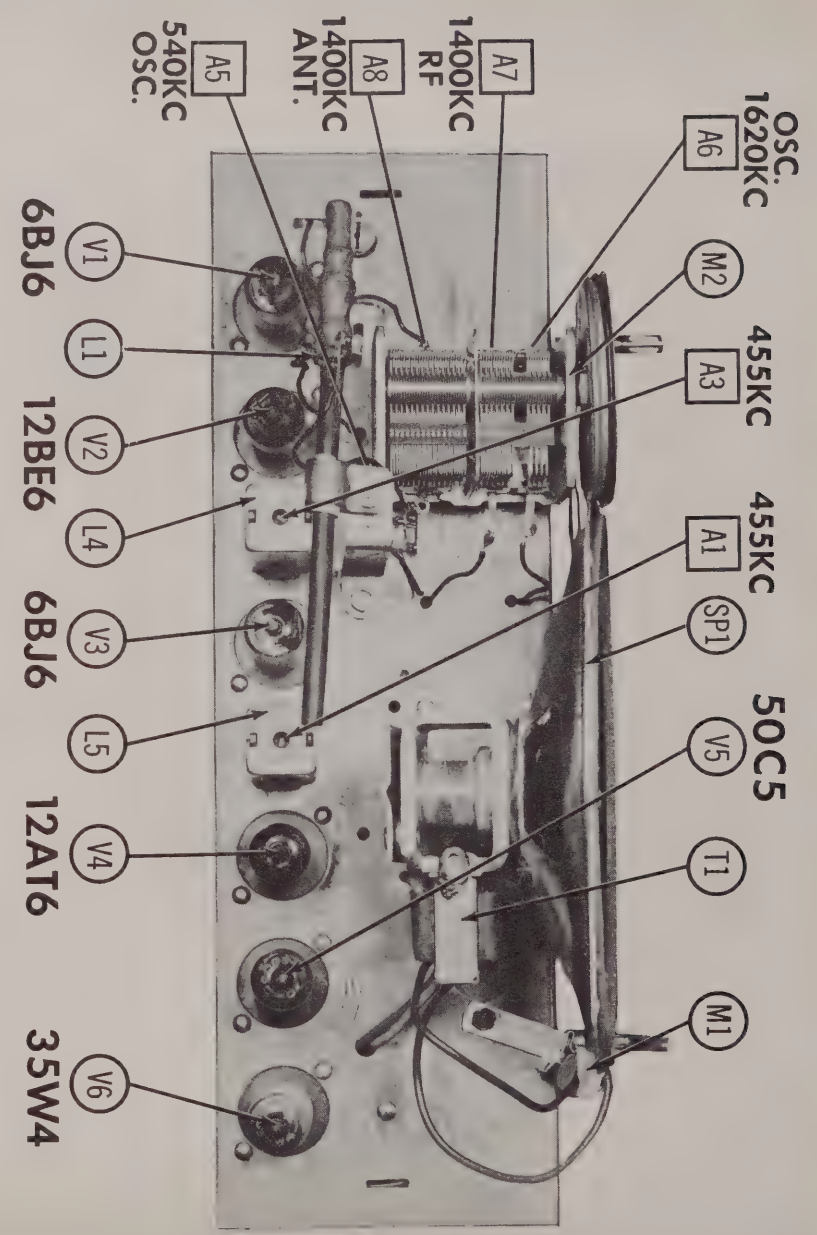
* CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS B13-133 & P1-102 (Panel)
B11-133 & R2-119 (Rear) & SWITCH 76-1.

## RESISTORS

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | ROLAND PART No. | IRC PART No. | |
| R2 | 470KΩ | ½ | | BTS-470K | |
| R3 | 220Ω | ½ | | BTS-220 | |
| R4 | 2200Ω | ½ | | BTS-2200 | |
| R5 | 10KΩ | ½ | | BTS-10K | |
| R6 | 68Ω | ½ | | BTS-68 | |
| R7 | 2.2Meg | ½ | | BTS-2.2Meg | |

| ITEM No. | RATING | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|
| | OHMS | WATT | ROLAND PART No. | IRC PART No. | |
| R8 | 4.7Meg | ½ | | BTS-4.7Meg | |
| R9 | 200KΩ | ½ | | | |
| R10 | 150Ω | 1 | | BTA-150 | |
| R11 | 330Ω | 1 | | BTA-330 | |
| R12 | 2200Ω | 1 | | BTA-2200 | |
| R13 | 18Ω | ½ | | | |

## CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | IMPEDANCE | | DC RES. | | ROLAND PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. | |
| | PRI. | SEC. | PRI. | SEC. | | | | | | |
| T1 | 2.6KΩ | 3.1Ω | 200Ω | .8Ω | | A-3332 ① | A-3025 ① | RO-302 ① | S-1X ① | ① Bend mtg.tabs down, file out slots, mount on original mtg. bracket. |

## SPEAKER

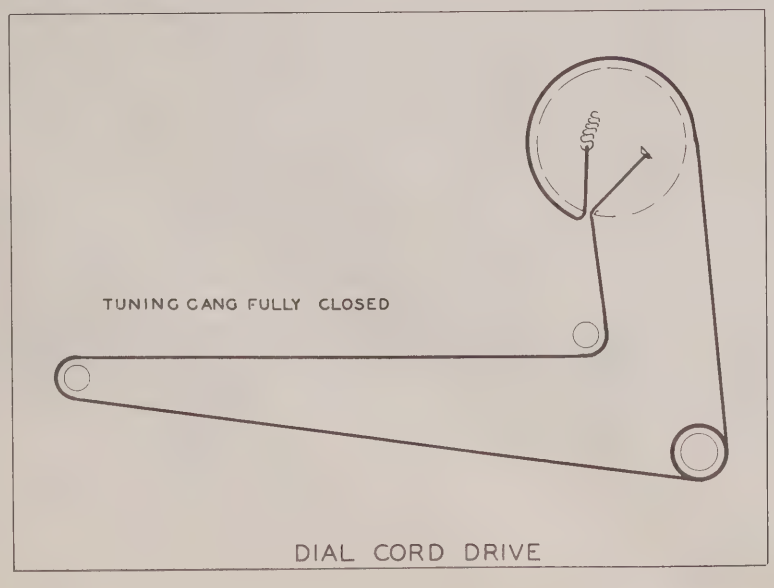
| ITEM No. | RATINGS | | | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | ROLAND PART No. | VIKING PART No. | QUAM PART No. | |
| SP1 | 4"X6" | PM | 3.1Ω | | 46J6 | 46A1 | |

## COILS (RF-IF)

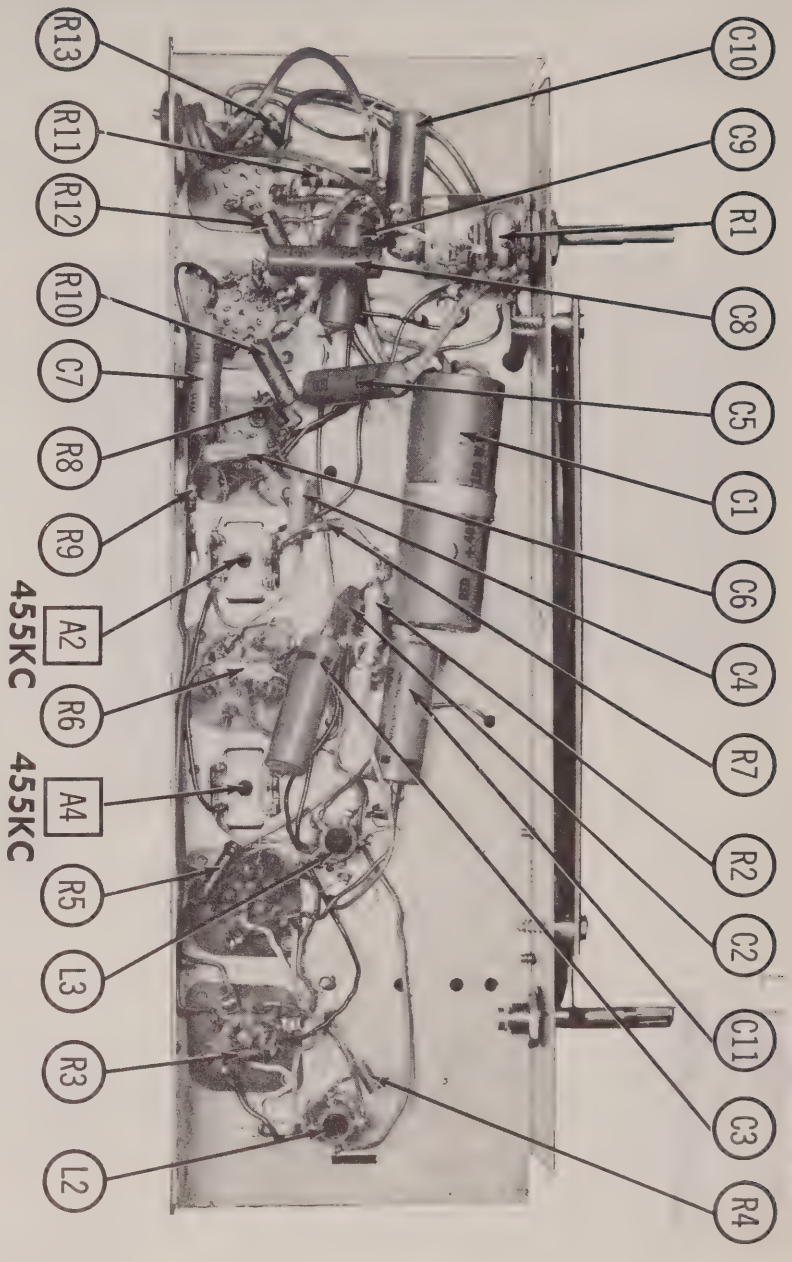
| ITEM No. | USE | DC RES. | | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | PRI. | SEC. | ROLAND PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | |
| L1 | Ant. Coil | .8Ω | | | | | | |
| L2 | RF Coil | 9.5Ω | 9.5Ω | | | BC-382 | 70-RF | |
| L3 | Osc. Coil | 1.2Ω | 9.5Ω | | | | 69-Osc. | |
| L4 | Input IF | 23Ω | 23Ω | LF-50 | 16-6758 | BC-352 | 12-C1 | |
| L5 | Output IF | 23Ω | 23Ω | LF-50 | 16-6758 | BC-353 | 12-C2 | |

## MISCELLANEOUS

| ITEM No. | PART NAME | ROLAND PART No. | NOTES |
|---|---|---|---|
| M1 | Dial Light | | Type #7 |
| M2 | Tuning Capacitor | CV22A | 37-517MMF, 15-223MMF, 10-87MMF |



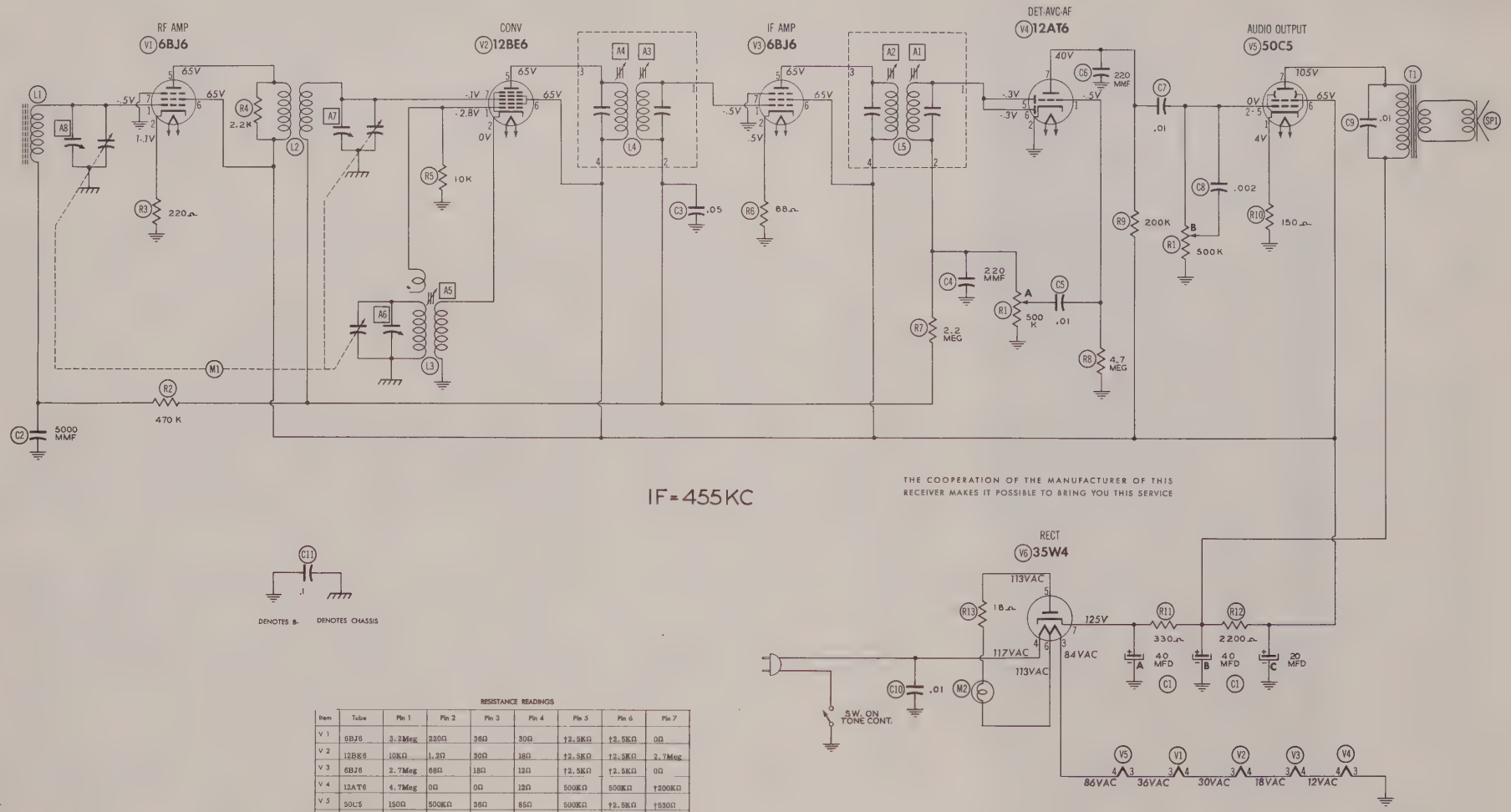

## CHASSIS—BOTTOM VIEW








ROLAND MODEL 6T1M




IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE







RESISTANCE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V 1 | 6BJ6 | 3.2Meg | 220Ω | 36Ω | 30Ω | †2.5KΩ | †2.5KΩ | 0Ω |
| V 2 | 12BE6 | 10KΩ | 1.2Ω | 30Ω | 18Ω | †2.5KΩ | †2.5KΩ | 2.7Meg |
| V 3 | 6BJ6 | 2.7Meg | 68Ω | 18Ω | 12Ω | †2.5KΩ | †2.5KΩ | 0Ω |
| V 4 | 12AT6 | 4.7Meg | 0Ω | 0Ω | 12Ω | 500KΩ | 500KΩ | †200KΩ |
| V 5 | 50C5 | 150Ω | 500KΩ | 36Ω | 85Ω | 500KΩ | †2.5KΩ | †530Ω |
| V 6 | 35W4 | †330Ω | INF | 85Ω | 115Ω | 128Ω | 110Ω | 150KΩ |

▲ TAKEN WITH VACUUM TUBE VOLTMETER.
† MEASURED FROM PIN 7 OF V6.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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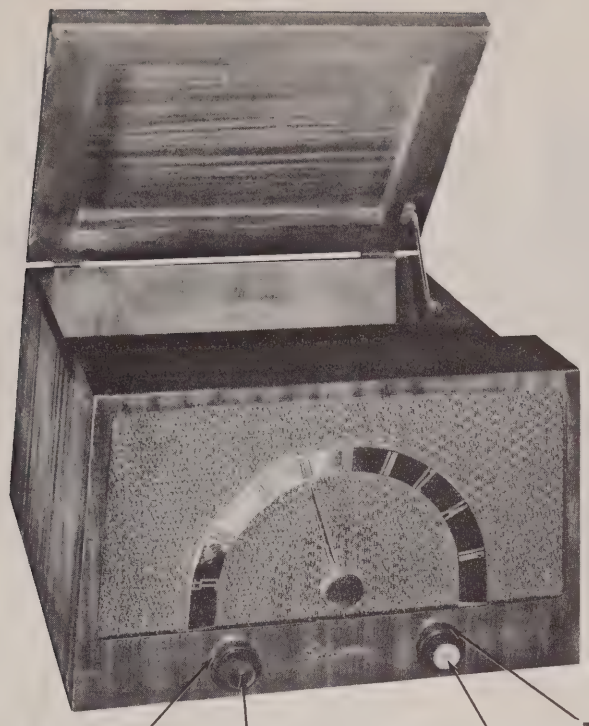
1- DC voltage measurements are at 20,000 ohms per volt, AC voltages measured at 1000 ohms per volt.
2- Socket connections are shown as bottom views.
3- Measured values are from socket pin to common negative.
4- Line voltage maintained at 117 volts for voltage readings.
5- Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6- Volume control at maximum, no signal applied for voltage measurements.

PROPERTY OF
U. S. F. B. I.

SILVERTONE MODELS 3040 (Ch. 528.253), 3045, 3046 (Ch. 528.254)




SILVERTONE MODELS 3040 (Ch. 528.253), 3045, 3046 (Ch. 528.254)

| | |
|---|---|
| TRADE NAME | Silvertone Models 3040 (Ch. 528.253), 3045, 3046 (Ch. 528.254) |
| SUPPLIER | Sears Roebuck & Co., 925 S. Homan, Chicago, Ill. |
| TYPE SET | AC Operated Radio-Phono Combination Superheterodyne Receiver |
| TUBES (Five) | Types 12SA7 Conv., 12SK7 IF Amp., 12SQ7 Det-AVC-AF Amp., 50L6GT Audio Output, 35Z5GT Rectifier. |

POWER SUPPLY 110-120 Volts AC-60 Cycles RATING 225 Amp @ 117 Volts AC
TUNING RANGE—BROADCAST 535-1630KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor inseries with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use as insulated alignment screwdriver for adjusting.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .1MFD | High side to pin 8 (grid) of 12SA7 (V1). Low side to B-. | 455K C (400~Mod) | Tuning gang fully open | Across voice coil | A1, A2, A3, A4 | Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation. |
| 2. | " | " | 1630KC | " | " | A5 | Adjust for maximum output. If range of A5 is insufficient adjust trimmer at opposite end of stator plates. |
| 3. | | Loop | 1400KC | Tune to 1400KC signal | " | A6 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |

Replace chassis in cabinet, turn tuning gang fully closed and set pointer parallel with base of dial at low frequency end of dial.

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT-SEE SIMILAR V-M MODEL 950-PHOTOFACT SET 107-FOLDER 13 OR RECORD CHANGER MANUAL CM-3.



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# PARTS LIST AND DESCRIPTIONS



## TUBES (SYLVANIA, GENERAL ELECTRIC or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA: SILVERTONE PART No. | REPLACEMENT DATA: STANDARD REPLACEMENT | RTMA BASE TYPE | INSTALLATION NOTES |
|---|---|---|---|---|---|
| V1 | Converter | 12SA7 | 12SA7 | 8R | |
| V2 | IF Amplifier | 12SK7 | 12SK7 | 8N | |
| V3 | Det-AVC-AF Amp. | 12SQ7 | 12SQ7 | 8Q | |
| V4 | Audio Output | 50L6GT | 50L6GT | 7S | |
| V5 | Rectifier | 35Z5GT | 35Z5GT | 6AD | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING: CAP. | RATING: VOLT | REPLACEMENT DATA: SILVERTONE PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C1A | 50 | 150 | 313-304 | PRS150/50-30 | | EDL5315 | | 2N520 | TVA-2450 | |
| B | 30 | 150 | | | | | | | | |
| C2 | .05 | 200 | T16-197 | P288-05 | DF-503 | PTE2S5 | | PT415 | 2TM-S5 | |
| C3 | 47 | | T15-229 | SI47N750 | TCN-47 | | N750K-470 | NT-5447 | 5TCU-Q47 | |
| C4 | .05 | 400 | T16-189 | P488-05 | DF-503 | PTE4S5 | | PT415 | 4TM-S5 | |
| C5 | .02 | 400 | T16-150 | P488-02 | DD-203 | PTE4S2 | | PT412 | 4TM-S2 | |
| C6A | 220 | | T17-104 | SI220 | D6-221 | 5W5T25 | GP2K-221 | UC-5322 | 34C3 | |
| B | .002 | | | BPD-002 | MD-202 | TM5D2 | 801-002 | DC-522 | | |
| C | 220 | | | SI220 | D6-221 | 5W5T25 | GP2K-221 | UC-5322 | | |
| D | .005 | | | BPD-005 | MD-502 | TM5D5 | 811-005 | DC-525 | | |
| C7 | .005 | 600 | T16-190 | P688-005 | D6-502 | PTE6D5 | GP2-333-103 | PT625 | 6TM-D5 | |
| C8 | .005 | 600 | T16-190 | P688-005 | D6-502 | PTE6D5 | GP2-333-103 | PT625 | 6TM-D5 | |
| C9 | .05 | 400 | T16-189 | P488-05 | | PTE4S5 | | PT415 | 4TM-S5 | |
| C10 | .05 | 400 | T16-189 | 489ZX-05 | | PTE4S5 | | PT415 | 4TM-S5 | |

## CONTROLS

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: SILVERTONE PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 500KΩ | ½ | T24-194 | QJ-347R* | | | UF55L | Tone-Panel |
| B | 1 Meg | ½ | | | | | UR16A | Volume-Rear |
| C | Switch | | | | | | US-26 | Attach to R1A |

* CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS B11-133 & P1-102 (Panel) B13-137 & R2-127 (Rear) & SWITCH 76-1.

## RESISTORS

| ITEM No. | RATING: OHMS | RATING: WATT | REPLACEMENT DATA: SILVERTONE PART No. | REPLACEMENT DATA: IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R2 | 22KΩ | ½ | T60-659 | BTS-22K | |
| R3 | 2.2Meg | ½ | T60-726 | BTS-2.2Meg | |
| R4 | 47KΩ | ½ | T60-730 | BTS-47K | |
| R5 | 470KΩ | ½ | T60-731 | BTS-470K | |
| R6 | 10Meg | ½ | T60-728 | BTS-10Meg | |

| ITEM No. | RATING: OHMS | RATING: WATT | REPLACEMENT DATA: SILVERTONE PART No. | REPLACEMENT DATA: IRC PART No. | NOTES |
|---|---|---|---|---|---|
| R7 | 220KΩ | ½ | T60-667 | BTS-220K | |
| R8 | 470KΩ | ½ | T60-731 | BTS-470K | |
| R9 | 180Ω | ½ | T60-774 | BTS-180 | |
| R10 | 1000Ω | 1 | T60-732 | BTA-1000 | |
| R11 | 27Ω | ½ | T60-690 | | |

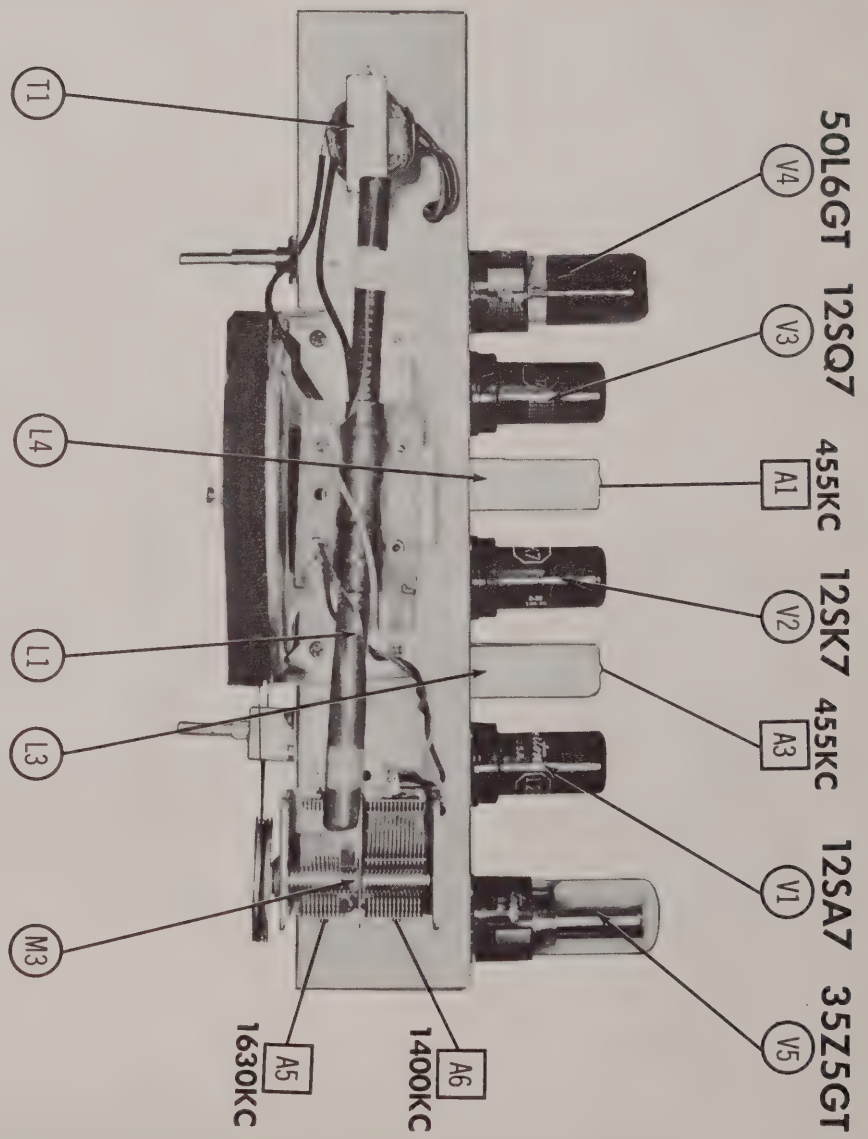
## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING: IMPEDANCE PRI. | RATING: IMPEDANCE SEC. | RATING: DC RES. PRI. | RATING: DC RES. SEC. | REPLACEMENT DATA: SILVERTONE PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | TRIAD PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 2.46KΩ | 2.9Ω | 227Ω Tap @ 12Ω | .58Ω | 80-268 | A-3330 | A-3031 | RO-3 | S-1X | |

## SPEAKER

| ITEM No. | RATINGS: SIZE | RATINGS: FIELD | RATINGS: V. C. IMP. | REPLACEMENT DATA: SILVERTONE PART No. | JENSEN PART No. | QUAM PART No. | NOTES |
|---|---|---|---|---|---|---|---|
| SP1 | 5" | PM | 2.9Ω | 79-391 | ST-105 Mod. P5-X | 5A1 | |

## CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## COILS (RF-IF)

| ITEM No. | USE | DC RES. PRI. | DC RES. SEC. | REPLACEMENT DATA: SILVERTONE PART No. | REPLACEMENT DATA: MEISSNER PART No. | REPLACEMENT DATA: MERIT PART No. | REPLACEMENT DATA: MILLER PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|
| L1 | Ant. Coil | .5Ω | | T82-72 | | | | |
| L2 | Osc. Coil | 1.5Ω | 8Ω | T10-572 | 14-1074 | | 70-Osc.* | |
| L3 | Input IF | 20Ω | 20Ω | T10-508 | 16-6758 | BC-352 | 12-C1 | |
| L4 | Output IF | 23Ω | 23Ω | T10-479 | 16-6758 | BC-353 | 12-C2 | |

* Disregard tap on secondary winding.

## PHONO CARTRIDGE

| ITEM No. | REPLACEMENT DATA: SILVERTONE PART No. | ASTATIC PART No. CARTRIDGE | ASTATIC PART No. NEEDLE | SHURE PART No. CARTRIDGE | SHURE PART No. NEEDLE | ELECTRO-VOICE PART No. CARTRIDGE | ELECTRO-VOICE PART No. NEEDLE | REMARKS |
|---|---|---|---|---|---|---|---|---|
| M1 | K3560 | GC-AG-J | G-AG | WC36B | A56U | 43 | 0-2<br>0-2 | |

ASTATIC, SHURE, AND ELECTRO VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

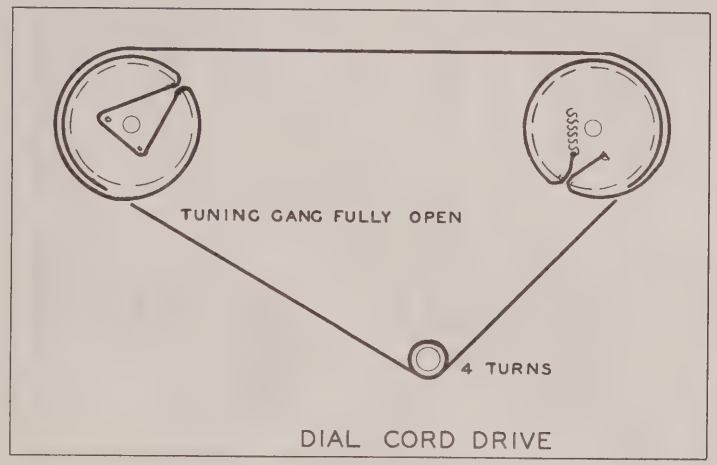
## PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

| ITEM No. | REPLACEMENT DATA: SILVERTONE PART No. | WALCO PART No. | JENSEN PART No. | REMARKS |
|---|---|---|---|---|
| M2 | K5732 | W-3AGA or W-3AGS | S-642 or S-652 | |

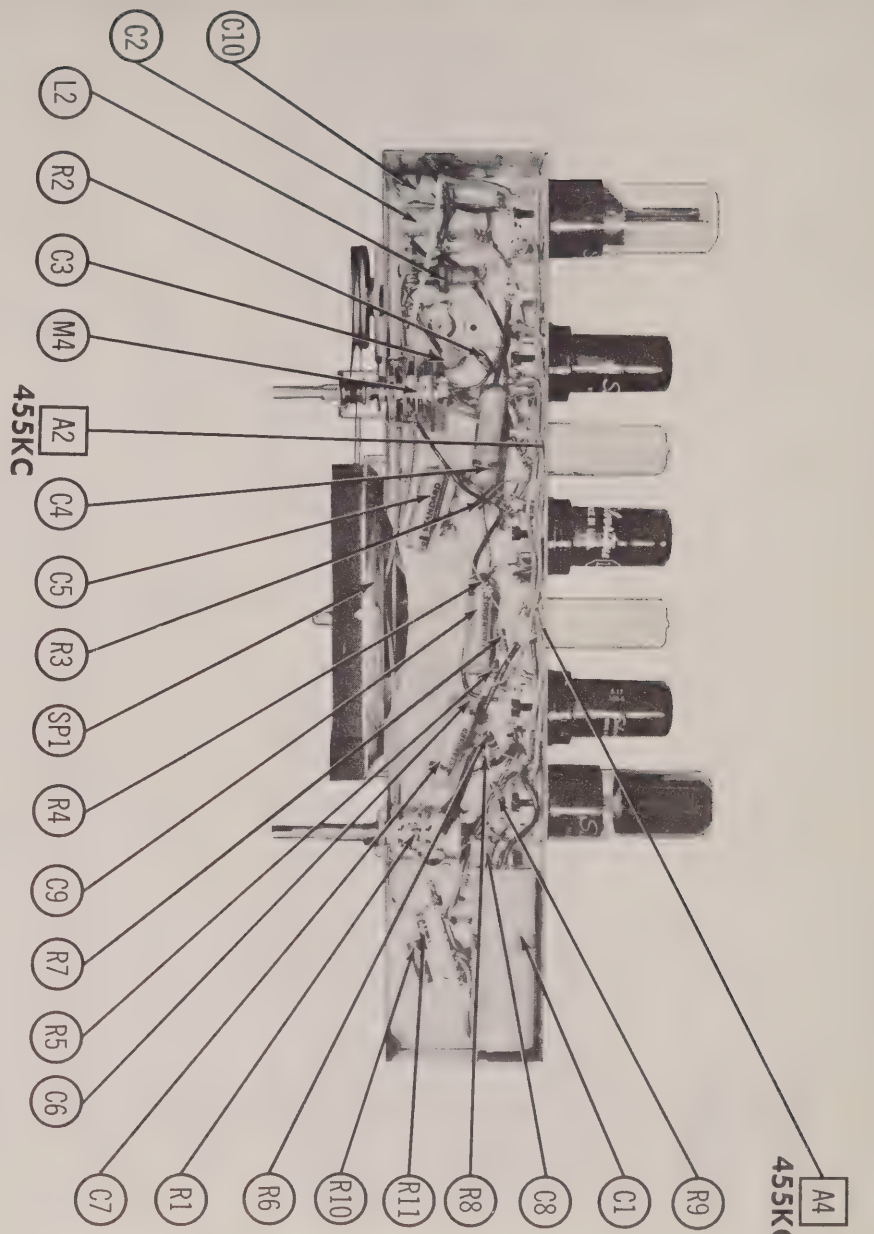
## MISCELLANEOUS

| ITEM No. | PART NAME | SILVERTONE PART No. | NOTES |
|---|---|---|---|
| M3 | Tuning Capacitor | T19-225 | |
| M4 | Switch | T69-188 | Radio - Phono Selector |
| | Cabinet | T42-561 | Mahogany, Model 3045 |
| | Cabinet | T42-562 | Limed Oak, Model 3046 |
| | Plate (Dial Scale) | T67-564 | |
| | Pointer | T58-83 | |
| | Knob | T52-411 | Tuning and Tone (2 Used) |
| | Knob | T52-346 | Off-On Volume & Radio-Phono Selector (2 Used) |




DIAL CORD DRIVE

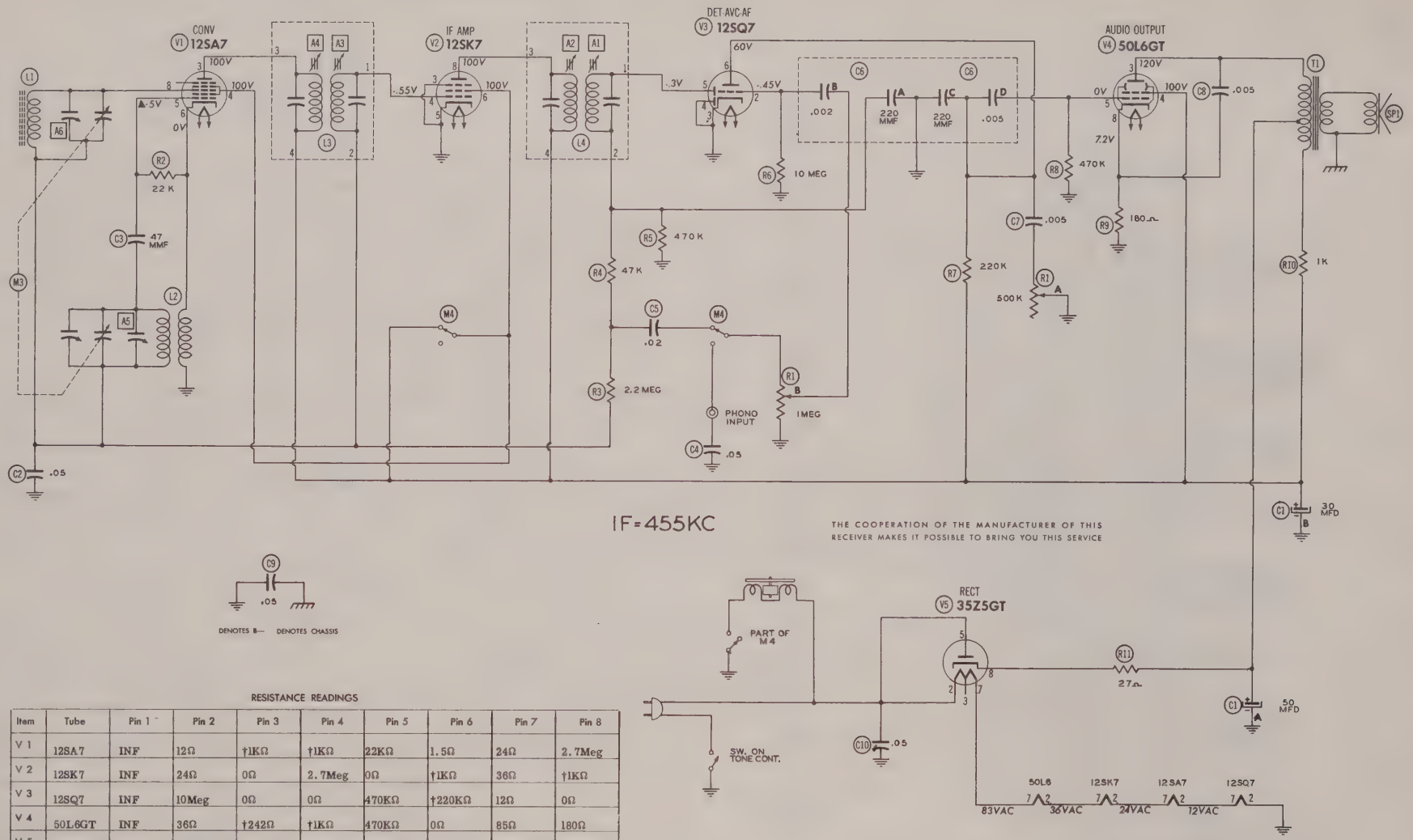
## CHASSIS—BOTTOM VIEW








SILVERTONE
MODEL 3040 (Ch. 528, 253)




IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

DENOTES B— DENOTES CHASSIS

RESISTANCE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 |
|---|---|---|---|---|---|---|---|---|---|
| V 1 | 12SA7 | INF | 12Ω | †1KΩ | †1KΩ | 22KΩ | 1.5Ω | 24Ω | 2.7Meg |
| V 2 | 12SK7 | INF | 24Ω | 0Ω | 2.7Meg | 0Ω | †1KΩ | 36Ω | †1KΩ |
| V 3 | 12SQ7 | INF | 10Meg | 0Ω | 0Ω | 470KΩ | †220KΩ | 12Ω | 0Ω |
| V 4 | 50L6GT | INF | 36Ω | †242Ω | †1KΩ | 470KΩ | 0Ω | 85Ω | 180Ω |
| V 5 | 35Z5GT | INF | 120Ω | 112Ω | INF | 120Ω | INF | 85Ω | 350KΩ |

ALL MEASUREMENTS TAKEN IN "RADIO" POSITION.
▲ TAKEN IN VACUUM TUBE VOLTMETER.
† MEASURED FROM PIN 8 OF V5.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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216-10

1- DC voltage measurements are at 20,000 ohms per volt, AC voltages measured at 1000 ohms per volt.
2- Socket connections are shown as bottom views.
3- Measured values are from socket pin to common negative.
4- Line voltage maintained at 117 volts for voltage readings.
5- Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6- Volume control at maximum, no signal applied for voltage measurements.

PROPERTY OF

V-M
MODELS 950, 951 (Late)

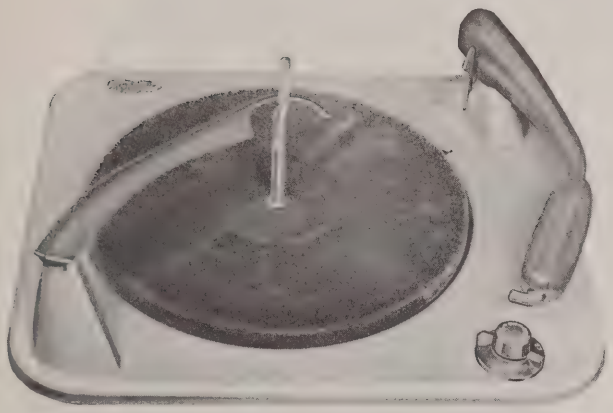

Figure 1A. Model 950

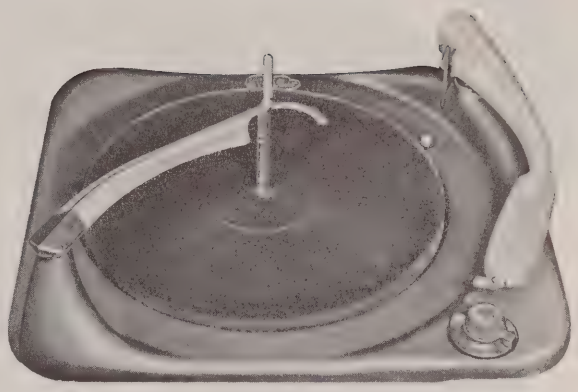

Figure 1B. Model 951

V-M
MODELS 950, 951 (Late)

## GENERAL INFORMATION

V-M Tri-o-matic Intermix Models 950 and 951 Record Changers are designed to play standard 78 RPM, fine-groove 45 RPM, or micro-groove 33 1/3 RPM records of standard commercial dimensions. Records up to 12 inches in diameter can be played.

Features of these changers include playing and automatically changing as many as ten 12", twelve 10", or any assortment of 10" and 12" records of the same type (33 1/3 or 78 RPM).

A full stack of twelve 7", 33 1/3 RPM records or a full stack of twelve 7", 45 RPM records (with the use of an adapter) will also play on these changers.

These changers automatically shut off after the last record has been played.

Connect these changers only to an outlet supplying 117 volts, 60-cycle AC unless otherwise specified.

Manufactured by:

V-M Corporation
Benton Harbor, Michigan

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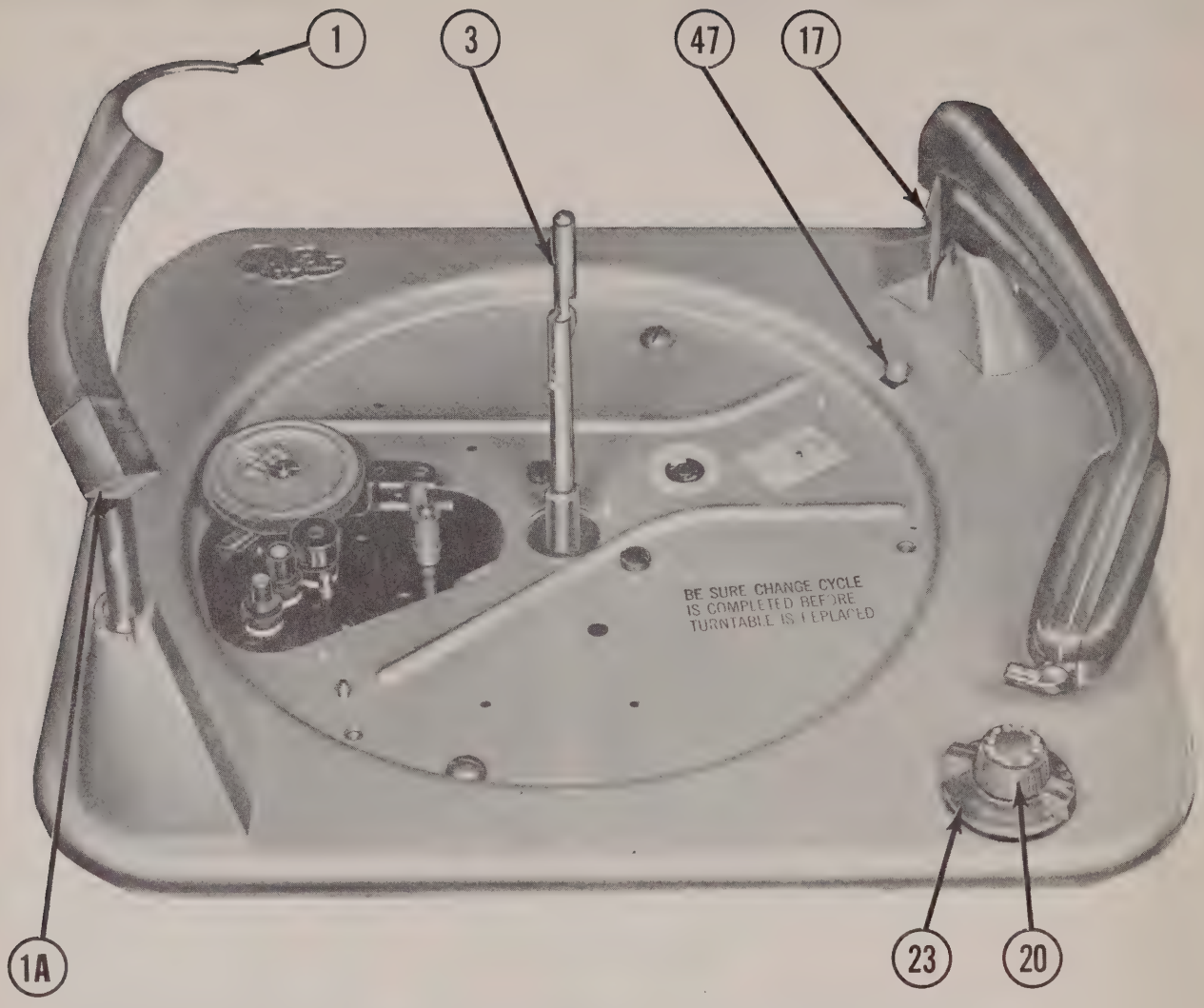


Figure 2

## PREPARING FOR OPERATION

Shipping Bolts (For Models Equipped With Mounting Pan)-

Before placing in operation, the machine must be floated freely on the mounting springs. During shipment, the mechanism is secured by means of two shipping bolts. To float the changer, remove the turntable by lifting it straight up the spindle. Turn the two shipping bolts in a clockwise direction as far as they will go and replace the turntable. Before the turntable can be fully seated, the idler wheel must be gently pushed back out of the way to prevent damage to the motor.

## OPERATION

Loading-

1. Pull straight up on record support knob until record support clears spindle. Swing record support to the left until pin in shaft drops into locating groove.

2. The changer will automatically play ten 12" either standard or long-play records, twelve 10" either standard or long-play records, any assortment of ten 12" and 10" records intermixed, or twelve 7" long-play or fine-groove records.

NOTE: Standard, fine-groove, and long-play records cannot be intermixed. Motor speed control knob must be reset for each type of recording.

3. Place records on spindle and lower to offset shelf. Hold records level and replace record support over spindle.

To Play Standard Recordings-

1. Motor speed control knob must be in the "78" position.

2. To start, turn changer control knob to "Rej." and release. Changer will operate automatically until the last record has been played. Pickup arm returns to rest and the changer control knob to the "Off" position. Changer automatically stops.

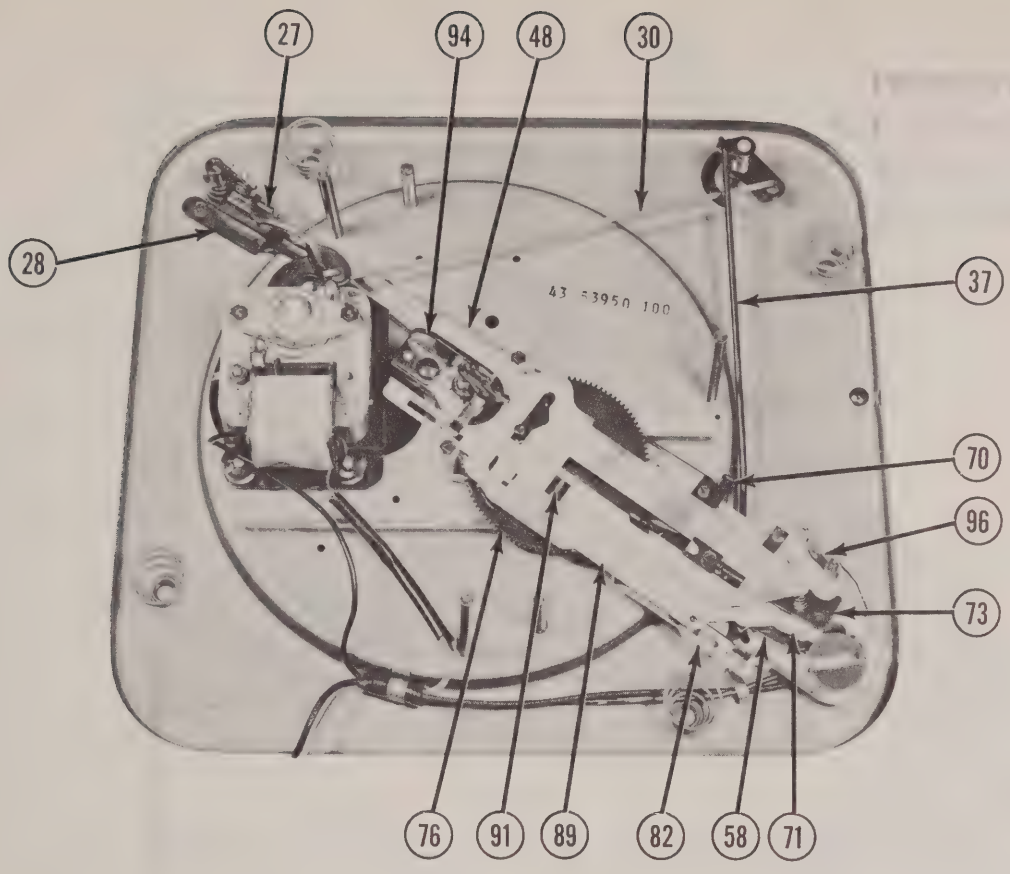


Figure 3

Leveling Record Changer-

It is essential to have the record changer absolutely level. Use a torpedo or similar type level on the record changer baseplate. Use adequate shims to level the record changer pan or radio combination cabinet to achieve perfect level.

To Play Long-Play (33 1/3 RPM) Records-

1. Motor speed control knob must be in the "33" position.

To Play Fine-Groove (45 RPM) Records-

1. Motor speed control knob must be in the "45" position.

2. Most of these records are manufactured with a 1.1/2" spindle hole. It is essential that a record adaptor be used with all large hole records.

Rejecting-

To reject a record at any time while changer is operating, turn changer control knob to "Off". Lift pickup arm and place on rest.

Stopping-

To turn off changer before automatic shut-off, turn changer control knob to "Off". Lift pickup arm and place on rest.

Unloading-

Lift the record support and swing to the left until pin in shaft drops into locating groove. Lift stack of records straight up and off spindle.

Manual Operation-

To play single records or home recordings, allow the changer to go through its complete shut-off cycle. Lift the record support arm and move it to the left until clear of the turntable. Place record on spindle and lower to spindle shelf. Tilt record down toward the rear of pickup arm and lower record to turntable. Turn changer control knob to "On" position only. Raise pickup arm and gently place needle in lead-in groove of record.

Repeating Of 7", 10", Or 12" Records-

To repeat records, swing record support clear of turntable, place record on the turntable, and start changer. Record repeats until control is turned "Off". If a 12" record is repeated, wait for the changer to finish cycling and reposition the pickup arm manually to the 12" position.

Suggestions-

When loading and unloading the changer, use care to prevent bending the spindle. Records should not be left on spindle except during operation of changer. Records will warp. When machine is not in use, it is suggested that the speed control knob be left in "N" position. This position is identified by the letter "N"

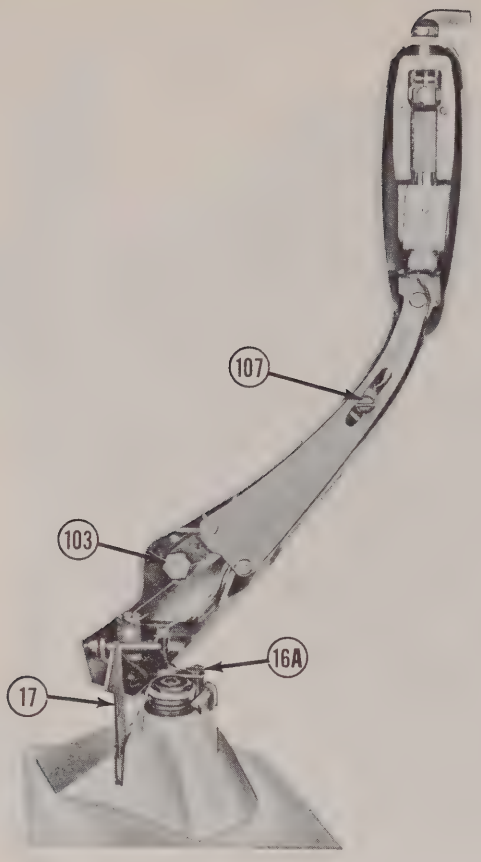


Figure 4

engraved on the speed control knob. For best reproduction, keep needle and records clean. Store records flat, in folders or in albums. Do not lay record on record.

## CHANGE CYCLE

It is recommended that the change cycle operation, be observed by rotating the turntable by hand. The action described below can then be readily followed and the function of each part more easily understood.

This changer is provided with what is known as a velocity trip mechanism. The change cycle is started by the faster inward motion of the pickup arm when the needle enters the trip grooves at the end of the record. Only records having fast finishing grooves before the eccentric cycling groove will operate this velocity trip.

The pickup arm and hinge assembly and trip finger cam and shaft assembly (73) are secured at opposite ends so that they move in unison. As the pickup arm nears the end of a record, the trip finger cam (73) pushes the trip link (82), which, in turn, engages the trip lever (81) rotating the pawl lever (79) to move the trip pawl toward the hub on the turntable. While a record is playing, the small motions of the trip pawl are not sufficient to cycle the mechanism because on each revolution of turntable the wiping contact by the hub projection moves the trip pawl back to clear the projection.

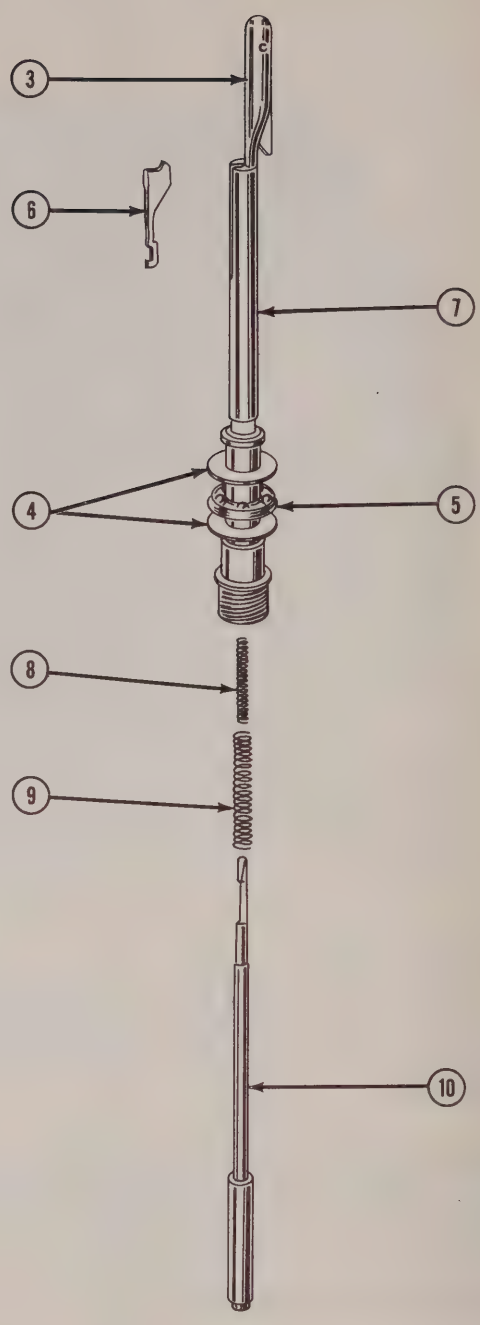


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Figure 5

In the first revolution of the turntable during which the pickup arm advances rapidly, the trip pawl is moved far enough to definitely engage the projection on the turntable hub. The gear on the turntable hub will now engage the main gear (76) and start its rotation. This in turn, starts the lateral motion of the slide and cam assembly (89). The slide and cam assembly (89) moves to the rear through the action of an eccentric pin on the main gear (76) moving in the cross slot on the slide and cam assembly (89).

As the slide and cam assembly begins to move, the cam surface at the rear pushes the lift pin (15) up-

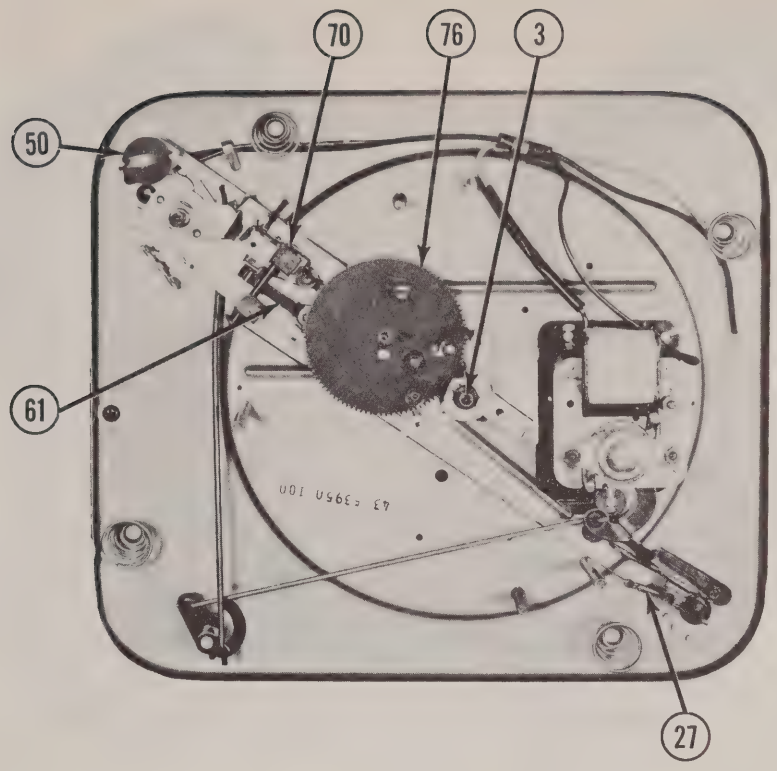



Figure 6

ward, raising the pickup arm clear of the record. At the same time, the tab on the rear of the slide and cam assembly (89) contacts the trip finger cam (73) swinging the pickup arm clear of the turntable.

The front edge of the ejector link slot in the slide and cam assembly (89) then contacts the ejector link on the ejector link assembly (94). The ejector link moves the pusher shaft and housing assembly (10) upward actuating the spindle assembly (3), causing the record pusher (6) to move straight up so as to enter the center hole of the record, and then to be pivoted forward, dropping a record to the turntable. (See Figure 5).

Simultaneously, the tab on the rear of the slide and cam assembly (89) contacts the pickup arm return locator (71), moving it clear of the reset lever (64). The pickup arm return locator (71) is now locked in position with the trip finger cam (73) by means of matching holes in the pickup arm return locator (71) and detents in the trip finger cam (73). This is accomplished by the pressure of the compressed conical lift pin spring (74) overcoming the pressure of the lift pin compression spring washer (72).

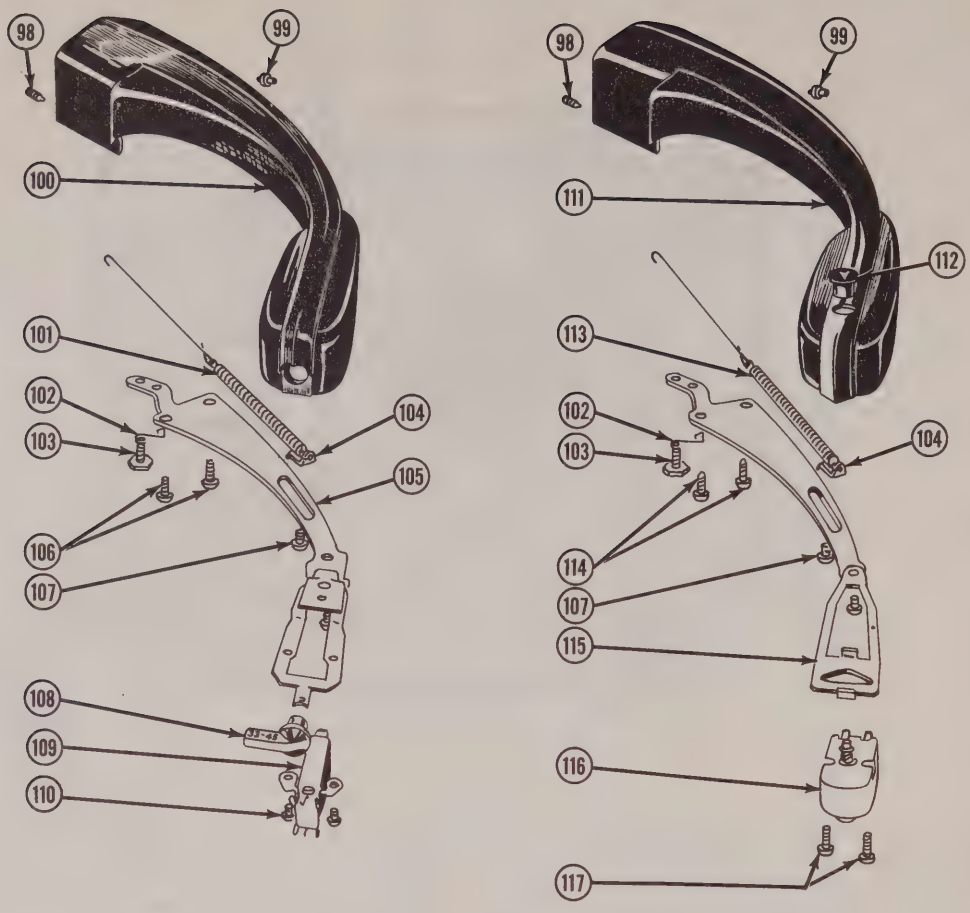
At the same time, the cam surface of the bracket on the main gear assembly (76) moves the reset lever (64) to mid-position (10" set-down) where it is held by the 12" record selector (17). The slide and cam assembly (89) continues to the rear and then starts forward. If 7" records are being changed, the rubber bumper (47) of the 7" set-down lever (61) is free to move upward permitting the other end to drop into the hole in the main gear (76) as this gear rotates. This action of the 7" set-down lever (61) raises the reset lever (64) to the upper position (7" set-down).

If 10" records are being changed, the 7" set-down lever (61) will not operate as the rubber bumper (47) will contact the edge of the record and the reset lever (64) will remain in the mid-position (10" set-down) as originally placed by the caming action of the bracket on the main gear (76).

If a 12" record is being changed, the edge of the record strikes the 12" record selector (17) releasing the reset lever (64) which drops to the bottom position (12" set-down).

As the slide and cam assembly (89) continues forward, the tab on the rear of the slide will move clear of the pickup arm return locator (71) and trip finger cam (73), which are still locked together. These rotate under the action of the pickup arm return spring (51) until one of the three set-down steps in the pickup arm return locator (71) strikes the reset lever (64), which has been positioned by the record being changed (see above). This stops the inward movement of the pickup arm return locator (71), trip finger cam (73) and pickup arm. The pickup arm is then lowered to the lead-in grooves of the record at this point as the lift pin (15) rides down the rear cam surface of the slide and cam assembly (89). As the pressure is released from the conical lift pin spring (74), the lift pin compression spring washer (72) separates the pickup arm return locator (71) and trip finger cam (73), permitting the pickup arm to ride freely across the record.

As soon as the last record has been dropped, the record support assembly (1) drops below the shelf on the spindle assembly (3) and the lower end of the record support post contacts the arm of the shut-off lever on the shut-off lever bracket assembly (28). This pulls the control link (48), which in turn, rotates the crank of the lever assembly (70). This forces the lever assembly (70) against the escape lever (90) on the slide and cam assembly (89). At the end of the change cycle, which drops the last record, the end of the lever assembly (70) drops into the main slot on the slide and

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EXPLODED VIEWS OF TONE ARMS

cam assembly (89), and the other end of the lever assembly (70) is pushed against the pickup arm return locator (71).

When the last record has been played, the change cycle starts again; however, this time, as the pickup arm return locator (71) is pivoted clear of the reset lever (64) by the tab on the slide and cam assembly (89), the lever assembly rises to the shut-off position. A tab on the lever assembly (70) raises the trip link (82) to the upper position. As the pickup arm return locator (71) starts to return the pickup arm to the record, it is stopped by the lever assembly (70) with the pickup arm positioned over the pickup arm rest post (22). The main gear continues to rotate pulling the trip link (82) forward to reset it. A tab on the upper surface of the trip link (82) contacts a lever on the control shaft assembly (58) rotating the control shaft assembly to turn off the motor and return the control knob to the "Off" position.

As the slide and cam assembly (89) moves forward, the lift pin (15) rides down the rear cam surface lowering the pickup arm to the pickup arm rest post (22).

## TRIPPING & AUTOMATIC SHUT-OFF OPERATION

In the following paragraphs a complete explanation of the mechanical operation pertaining to the "Tripping" and "Automatic Shut Off" operations are given as these phases of the change cycle are likely to be the most difficult to understand.

### Tripping-

While a record is playing, the small motions of the trip pawl are not sufficient to cycle the mechanism because on each revolution of the turntable the wiping contact by the hub projection moves the trip pawl back to clear the projection. This slight movement of the pawl continues as long as the pickup moves in at a constant rate of speed. When the needle leaves the recorded section of the record, the rapid acceleration results in rapid movement of the trip pawl. The trip pawl assumes a position in which the projection on the turntable hub makes a positive contact and the main gear (76) is pushed sufficiently for engagement with the teeth on the turntable hub. This starts the change cycle.

### Mechanism Stops After Playing Of Last Record-

1. As the last record of the stack drops to the turntable the record support assembly (1) drops and actuates the stop arm on the shut-off bracket assembly (28). This stop arm in turn applies force to shut-off lever assembly (70) through spring (27) and control link (48). At this moment the slide and cam assembly (89) is in the outermost position (away from spindle)

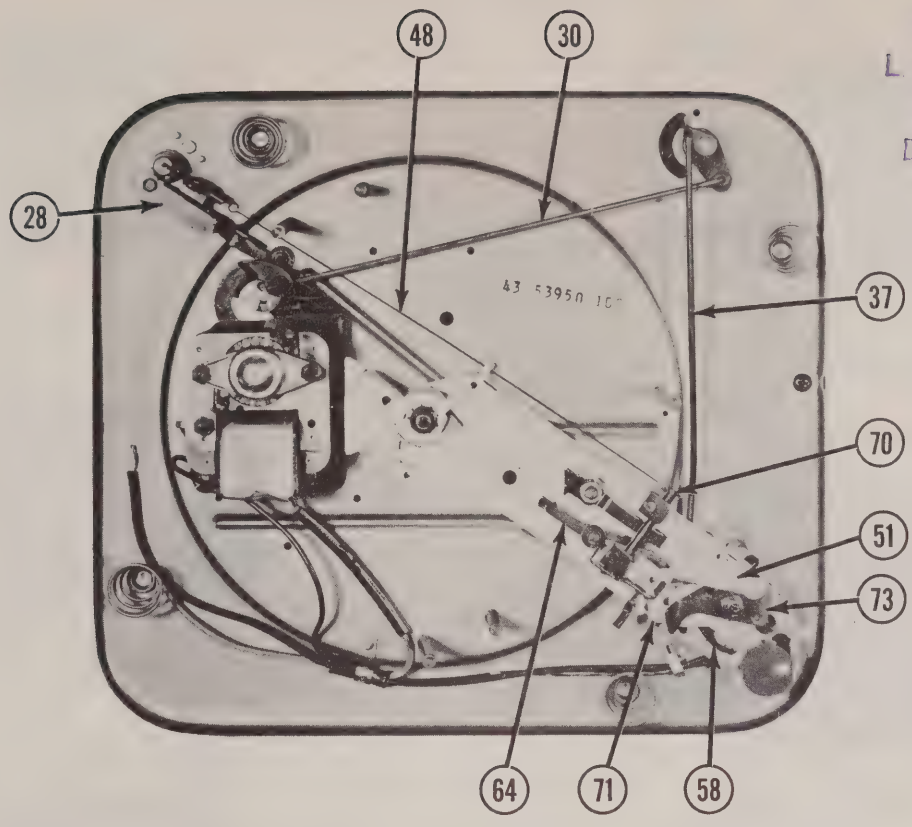



Figure 7

and the end of shut-off lever assembly (70) is forced against escape lever (90) which prevents it from lowering any further.

2. As the slide and cam assembly (89) returns to the out of cycle position the end of shut-off lever assembly (70) slides off the escape lever (90) permitting the end to extend down through the slot in the slide and cam assembly (89). At this time the pickup arm return plate (71) has rotated too far to be blocked by the other end of the shut-off lever (70) and the pickup arm is permitted to land on the record.

3. After the last record has been played the mechanism again goes into change cycle, and the slide and cam assembly (89) moves to its outermost position. At this moment the force which has been applied to the shut-off lever assembly (70) from the record support causes the end to lower, thus extending further through the slide and cam assembly (89). The other end of the shut-off lever (70) raises and blocks the pickup arm return locator (71) which at this moment is held back by the slide and cam assembly (89).

4. As the slide and cam assembly (89) moves back toward the spindle, it carries the raised trip link (82) along until finally the formed end of the trip link pushes control shaft (58) which in turn actuates power switch (50). This removes power from the drive motor and the mechanism stops.

5. The lift pin (15) rides down the incline on the rear of slide assembly (89) and lowers the pickup arm to the arm rest.

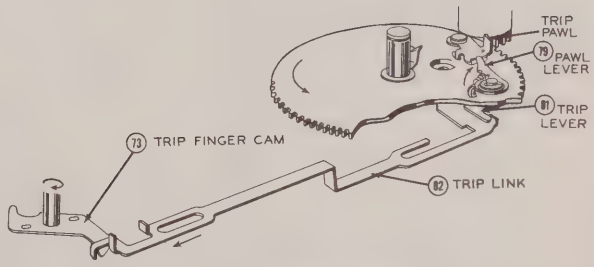



Figure 8

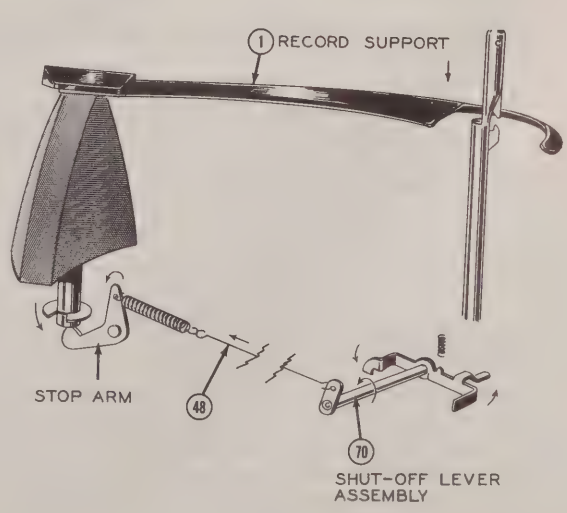
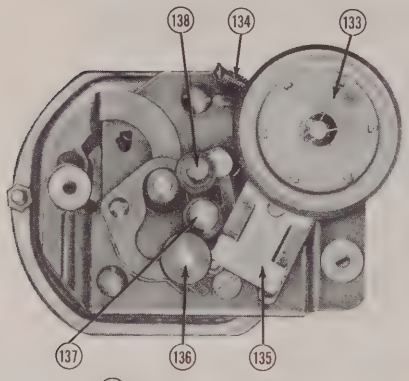
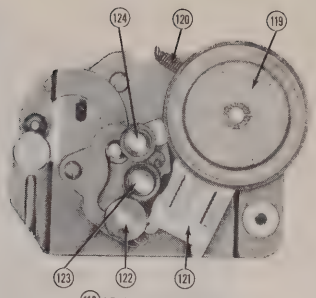



Figure 9

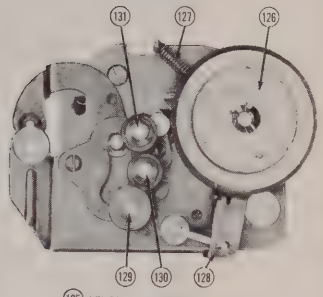
146 ALLIANCE TURRET MOTOR #4638



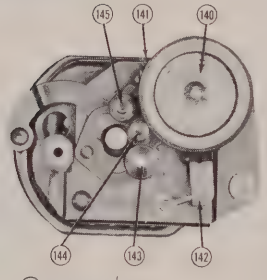
132 GENERAL INDUSTRIES 4 POLE TURRET MOTOR #4711



118 GENERAL INDUSTRIES TURRET MOTOR #5355



125 GENERAL INDUSTRIES TURRET MOTOR #5686



139 GENERAL INDUSTRIES 4 POLE TURRET MOTOR #5691

## LUBRICATION

Additional lubrication should not be required for the life of the changer, but in cases of unusual use or high-operating temperature, the changer should be lubricated as follows: (Refer to the exploded view).

Apply Andok "B" or Texaco Sta-Put to:

1. Edges of all slots in slide and cam assembly (89).
2. Outer edges of tines on forked end of slide and cam assembly (89).
3. Lift pin cam surface on slide and cam assembly (89).
4. Lower surface of pickup arm return locator (71).
5. Inner surface of tab on rear of slide and cam assembly (89).

Apply a small quantity of light mineral oil to:

1. Trip finger cam shaft (73).

## ADJUSTMENTS

Needle Set-Down (Refer to Figure 4)-

The set-down position of the needle is adjusted by means of the set-down adjustment screw (16A) mounted on the hinge arm assembly (16). Turn this screw adjusting pickup arm for correct set-down on a 10" record. When the correct set-down is obtained for the 10" position, the 12" and the 7" needle set-down will also be correct.

Pickup Arm Height (Refer to Figure 4)-

The pickup arm height is adjusted by the lift screw (103) located at the rear of the strengthener. To raise the height of the pickup arm, turn this screw counterclockwise. To lower this pickup arm, turn clockwise. The pickup arm height should be adjusted so that with a 1 1/8" stack of records on the turntable the pickup arm lifts 1/4" straight up as the change cycle starts.

Needle Pressure (Refer to Figure 4)-

The needle pressure should be between 10 and 12 grams. Adjustment may be made by loosening screw (107) on the slide which moves in a slot in the tone arm strengthener. Move the slide back or forward until the correct needle pressure is obtained.

## OLD AND NEW STYLE HINGE ASSEMBLIES

The changes outlined in this section should be noted as it is of the utmost importance when ordering replacement parts.

On the old style hinge assembly there were two different parts which were held together by means of a lockwasher and nut, whereas in late production these parts are secured together by means of staking. This eliminates any possibility of the tone arm changing its position after once being adjusted. This change will be in effect on changers manufactured after May 1, 1951.

A PHOTOFACT "EXPLODED" VIEW

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NEW STYLE

OLD STYLE

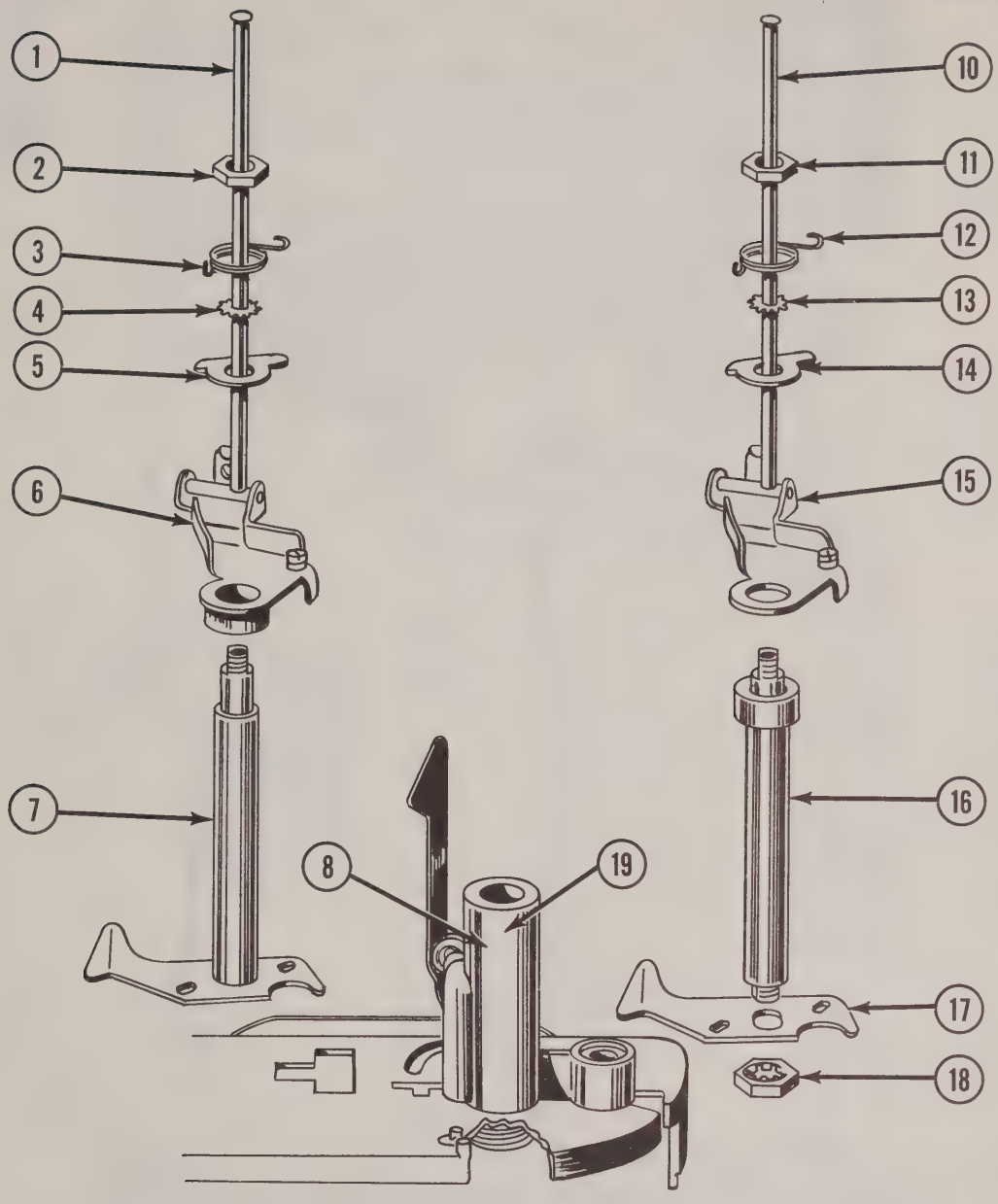


Figure 10

NEW IMPROVED HINGE ASSEMBLY

OLD STYLE HINGE ASSEMBLY

| Ref. No. | Part No. | Description | List Price | Ref. No. | Part No. | Description | List Price |
|---|---|---|---|---|---|---|---|
| 1 | 4327 | Lift Pin | .19 | 10 | 2220 | Lift Pin | .12 |
| 2 | 3887 | Jam Nut | .03 | 11 | 3887 | Jam Nut | .03 |
| 3 | 2247 | Safety Spring | .05 | 12 | 2247 | Safety Spring | .05 |
| 4 | 3888 | Lockwasher | .02 | 13 | 3888 | Lockwasher | .01 |
| 5 | 4339 | Safety Plate | .02 | 14 | 2249 | Safety Plate | .13 |
| 6 | 4072 | Hinge Arm Assembly | .68 | 15 | 2294 | Hinge Arm Assembly | .33 |
| 7 | 4331 | Finger and Shaft Assembly | .77 | 16 | 2921 | Tone Arm Shaft and Sleeve | .76 |
| 8 | 4330 | Frame Assembly | 3.43 | 17 | 2520 | Trip Finger | .12 |
| | | | | 18 | 1975 | Pal Nut | .01 |
| Prices subject to change without notice. | | | | 19 | 2948 | Frame Assembly | 2.70 |

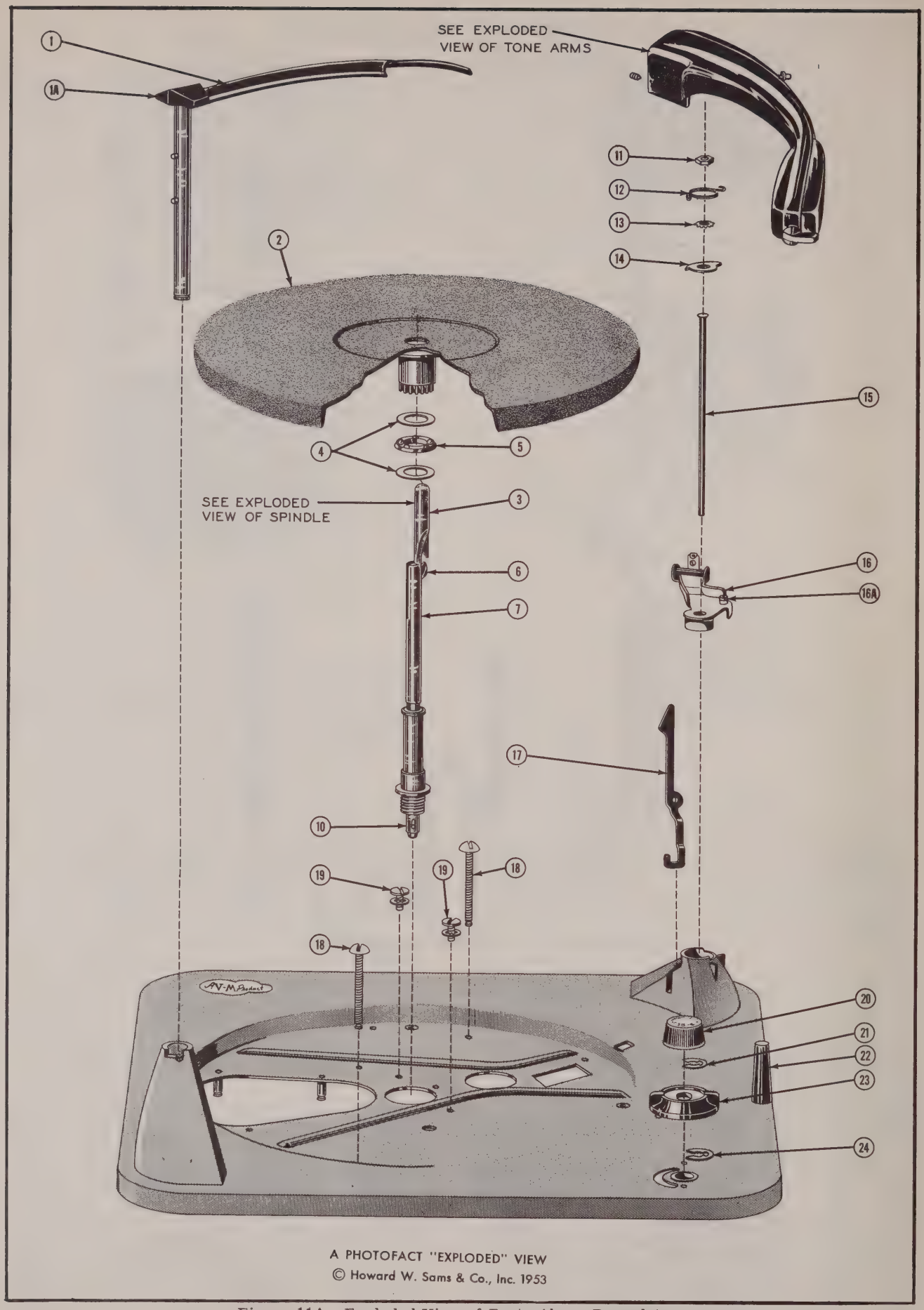


Figure 11A. Exploded View of Parts Above Baseplate.

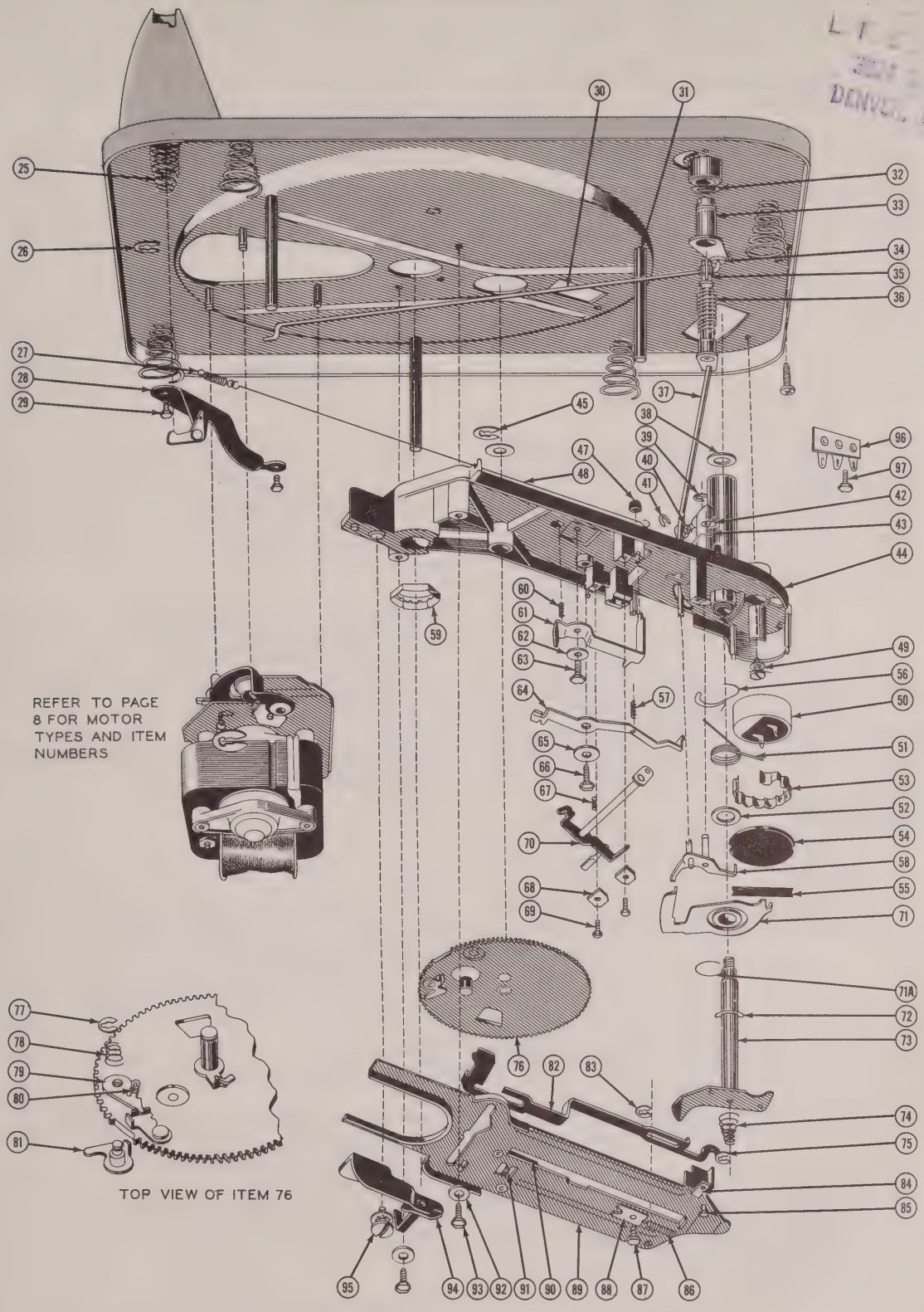


Figure 11B. Exploded View of Parts Below Baseplate.

## TROUBLE CHART

| SYMPTOM | CAUSE | REMEDY |
|---|---|---|
| Turntable does not revolve when control is turned to "On". | 1. No current at motor. | (a) Check that current is reaching AC leads of changer.<br>(b) Check that switch is closing.<br>(c) Check wiring and soldered terminals in the changer. |
| | 2. Motor defective. | (a) Remove turntable to allow motor to operate without load. If current is reaching motor and drive spindle does not rotate, the motor is defective. Repair or replace. |
| | 3. Motor idler wheel not engaging turntable rim. | If drive spindle is turning but turntable is not:<br>(a) Check motor idler assembly to determine if it is free to contact the drive spindle and turntable rim.<br>(b) Wipe off inside rim of the turntable (2) to remove flock, or if oily, clean the turntable rim and rubber tire of the idler wheel with naphtha, or alcohol. |
| Changer does not cycle when the control knob is turned to the "Rej". | 1. The manual reject not actuating the trip. | (a) Turn the control knob (20) to the reject position, hold and see that the control shaft assembly (58) has moved the trip link (82) to the rear. This should actuate the trip pawl on the main gear (76), which will bring the spur on the trip pawl in contact with the hub gear on the turntable hub.<br>(b) Check for binding of the pawl lever (79), the trip lever assembly (81) and the trip pawl. If binding occurs, clean out all foreign matter and check for freedom. |
| Control knob cannot be turned to "On" position. | 1. Machine shut off during cycle. | Turn the turntable clockwise, by hand, until the control knob (20) is free. |
| Pickup arm strikes records on spindle when it raises, or pickup arm rest when it moves out. | 1. Pickup arm height not adjusted properly. | (See instructions for adjusting pickup arm height under "Adjustments"). |
| Turntable speed too slow (refer to exploded view). | 1. Binding in turntable bearing. | Check the turntable bearing for freedom. Hold the motor idler wheel out of engagement with the turntable and spin the turntable, by hand, to see if it turns readily and coasts for a long time. If binding occurs, remove turntable, clean off foreign matter, and lubricate with light mineral oil. |
| | 2. Line voltage too low. | The line voltage should not be less than 105 volts or the turntable may be too slow. |
| | 3. Operating temperature too low. | If the machine has been stored in a cold place or operated in surroundings at a temperature of less than 60° F., the turntable speed may be too slow. |
| Turntable stalls or slows down during cycle refer to exploded view). | 1. Motor idler not engaging turntable. | (See "Turntable Does Not Revolve When Control Knob Is Turned to "On" Position"). |
| | 2. Binding in drive mechanism. | Hold idler away from turntable, or remove idler wheel. Cycle machine by turning turntable slowly by hand. The main gear should turn freely for the complete revolution without binding at any point.<br>(a) If binding occurs, check for foreign matter in the gear teeth, a bent gear bearing, or bent spindle bushing.<br>Straighten or replace. Clean and lubricate. |

TROUBLE CHART - Cont.

| SYMPTOM | CAUSE | REMEDY |
|---|---|---|
| | 3. Binding between pick-up arm lift pin (15) and lift pin cam surface on slide and cam assembly. | Lift pin should ride freely on cam surface without binding. |
| | 4. Spindle pusher spring compressing too far. | Cycle the changer and watch the relationship between the bottom of the pusher housing and the lower button of the pusher housing. Just before the slide and cam (89) has completed its backward motion, the pusher housing should stop its upward motion and the lower button should continue up .005 to .047" more, slightly compressing the pusher spring. If the spring compresses to much, the changer may stall on the shut-off cycle. |
| | 5. Motor weak. | When everything checks all right, but the changer still stalls in cycle, the motor may be weak. |
| | 6. Grease on idler wheel. | 1. Wipe off idler wheel rubber tire; inner rim of turn table and rubber belts with naphtha or alcohol. |
| | 7. Turrets unseated from lock ring on turret shaft. | Remove turret and center lock ring. (If lock ring is distorted, replace with new lock ring). Replace turret and press down to assure turret of being locked to the turret shaft. (Turret will snap into position when properly locked). |
| | 8. Idler slide bent. | Straighten and clean or replace. |
| | 9. Idler wheel tension spring weak. | Replace spring or bend motor tension spring anchor bracket to give desired tension. |
| Changer continues to cycle. | Reject Mechanism binding. | (a) Make certain the trip link (82) is not frozen in the reject position.<br><br>(b) Make certain the changer control lever (58) is not binding and that it actuates the trip link (82) when the changer control knob (20) is turned to reject.<br><br>(c) Check for binding of trip pawl, trip lever (81) and pawl lever (79); these must be free to turn easily.<br><br>(d) Check the changer control linkage, (37) and (58). |
| Noise during playing of record. | 1. Motor rumble. | If a low-pitched rumbling sound comes from the loud speaker while a record is being played, check motor grommets to be sure the motor is freely suspended on them. The motor lead wires should have slack to allow the motor to float. Motor rumble may also come from an unbalanced motor rotor; in this case, replace the motor. |
| | 2. Defective turntable bearings (5). | Defective turntable bearings can cause rumble. Check for foreign matter in the bearing, defective balls, binding between balls and ball retainer; rough surface on washers. Clean ball bearing, sleeve bearing, and washers; lubricate with light mineral oil. |
| | 3. Defective motor idler wheel or speed pulleys. | A rapid thumping sound while the motor is running may indicate a flat spot on the motor idler wheel or speed pulleys. If this condition does not clear up after ten minutes of running time, remove the turntable and check the rubber tire on the idler or pulleys. If the surface of the rubber tire is not smooth and even, replace the part. Should the bearing of the idler wheel show signs of excessive wear or be extremely wobbly, the idler wheel should be replaced. |
| | 4. Defective record. | Worn or defective records cause needle scratch and distortion of the recorded sound. If the record is warped, |

TROUBLE CHART - Cont.

| SYMPTOM | CAUSE | REMEDY |
|---|---|---|
| | | it may slip on the other records causing "Wow" (a waver in the recorded sound). An enlarged hole in the record can also cause "Wow". |
| | 5. Turntable scrapes. | If a scraping sound occurs as the turntable revolves, check:<br>(a) Turntable warped, causing outer rim to rise and fall.<br>(b) Motor idler or mounting plate bent. |
| | 6. Squeaks. | Squeaking sound as changer operates indicates lack of oil. Lubricate points indicated under "Lubrication". |
| | 7. Pulleys on motor not properly seated. | Check that pulleys are properly seated. |
| | 8. 7" lever (61) loose. | Check 7" lever washer (62) and screw (63) to see if they are tight. |
| Distortion of Recorded Sound. | 1. Defective record. | (See "Noise During Playing of Record"). |
| | 2. Defective amplifier. | Check phonograph amplifier and speaker. |
| | 3. Bad cartridge. | Replace. |
| No Sound During Playing. | 1. Defective cartridge. | Replace. (See "Defective Cartridges"). |
| | 2. Defective wiring. | Check pickup leads for a shorted or open lead. |
| | 3. Defective amplifier. | Check phonograph amplifier and speaker. |
| | 4. Loose cartridge terminal clips. | Remove, squeeze together slightly, and replace. |
| Excessive Record Wear. | 1. Binding on pickup arm. | (See "Needle Does Not Track Across Record Properly"). |
| Changer does not shut off after last record has been played (refer to exploded view). | 1. Record support binding (1). | The record support must drop below the off-set shoulder of the spindle or the changer will not shut off. (See "Two Records Drop at Once"). |
| | 2. Lever assembly binding (70). | Clean out dirt and make sure this operates smoothly. |
| | 3. Control link broken (48). | Replace. |
| | 4. Spring (27) loose or broken. | Replace. |
| | 5. Shut-off lever binding. | Check lever and if bent, straighten. |
| Rough pickup arm motion. | 1. Horizontal defects. | (a) Check pickup arm return locator (71) for tightness.<br>(b) Check that pickup arm return spring (51) is not weak and is hooked up properly.<br>(c) Check that fiber washer (52) is installed under pickup arm return locator. |
| | 2. Vertical defects. | (a) Lift pin (15) binding; clean out dirt and lubricate.<br>(b) Slide and cam (89) binds; check bearing points -- clean and lubricate. |

TROUBLE CHART - Cont.

| SYMPTOM | CAUSE | REMEDY |
|---|---|---|
| | | (c) Burrs in main slot in slide and cam (89) -- remove with fine file.<br><br>(d) Ejector lever on ejector bracket assembly (94) binding in slide and cam slot; straighten, remove burrs, and lubricate.<br><br>(e) Pickup arm shaft and sleeve binding; clean and lubricate. |
| Noise during change cycle. | 1. Tines on the forked end of the slide and cam assembly (89) bent. | Replace. |
| | 2. Lack of lubrication Grinding noise. | Lubricate ejector lever (94) where it contacts lower end of spindle (3). |
| Control knob does not detent on "33", "45", or "78" positions. | 1. Bent parts. | (a) Insure that forked shaped stamping under idler is catching in detent notch. Straighten or replace motor.<br><br>(b) Insure that speed control arm (34) and speed control rod (30) are not bent. |
| Cartridge drags on record. | 1. Needle bent. | Replace needle. |
| | 2. Cartridge mounting screws loose. | Tighten. |
| Shuts off when last record drops. | 1. Shut-off bracket (28) bent. | Straighten or replace. |
| | 2. Record support bent. | Bend down slightly so record support (1) is parallel with the base plate. |
| | 3. Shut-off link (48) bent. | Straighten or replace. |
| | 4. Loose bearing (68) on shut-off lever assembly (70). | Tighten. |
| Will not play manually. | 1. Trip link (82) bent. | Straighten or replace. |
| | 2. Trip finger cam (73) bent. | Straighten or replace. |
| Impossible to adjust set-down. | 1. Pickup arm shaft and sleeve assembly (73) defective. | Shift the safety plate (14) toward the eccentric set-down adjusting screw (16A), and tighten pickup arm shaft and sleeve nut (11). Hold pickup arm against rear stop and push on trip finger cam (73). The safety plate (14) should move away from the set-down adjusting screw (16A) and snap back when the trip finger cam (73) is released; if it does not, replace the pickup arm shaft and sleeve assembly (73). Hinge pivot screws may be adjusted favoring one side or the other. |
| Record does not drop when changer cycles. | 1. Spindle pusher shaft and housing assembly (10) broken. | If the pusher shaft (inside the spindle) is broken, the lower end (housing) will drop out of the spindle (7) (see Figure 5). Loosen spindle nut (59) and remove spindle (3). Replace with new spindle unit. |
| | 2. Record pusher (6) in spindle not moving far enough forward to eject a record. | The record pusher should move up inside the spindle body (7), then move forward until it has reached a point flush with, or a maximum of, .010" beyond the spindle body (7).<br><br>To insure that the record pusher (6) is all the way forward, the lower button on the shaft and housing assembly (10) should be raised high enough by the ejector lever to |

TROUBLE CHART - Cont.

| SYMPTOM | CAUSE | REMEDY |
|---|---|---|
| | | slightly compress the pusher spring inside the pusher shaft and housing assembly (10). (See "Turntable Stalls During Cycle"). If the spring is compressed and the record pusher (6) does not move far enough forward to eject a record, the spindle (3) should be replaced. If a record is not pushed completely off the ledge, it may hang on the spindle momentarily, then drop on the pick-up arm when it moves in over the turntable. |
| | 3. Record pusher (6) raises outside the spindle body (7). | When changer cycles, the record pusher (6) should rise up just inside the spindle body, then move forward inside the center hole in the record. If the record pusher (6) rises outside the spindle body (7), it will raise the record instead of pushing it off the spindle ledge. Remove the spindle (3) and replace with a complete new spindle assembly. |
| Two records drop at once (refer to exploded view and Figure 5). | 1. Hole in record too large. | Check the diameter of the hole in the record. An oversize hole will cause two records to drop at once. |
| | 2. Spindle guide not fully down. | If the spindle guide is not all the way down, more than one record may be dropped at a time.<br><br>(a) Check the guide to be sure it is free and does not bind at any point. Clean out foreign matter of straighten if necessary. Do not oil.<br><br>(b) When records are placed on the spindle, be sure the guide is all the way down. The guide will normally raise as a record is being dropped, but it should return to place immediately, by gravity. |
| | 3. Record pusher (6) defective. | The record pusher (6) may be deformed, etc. This may cause two records to drop at once. Replace with new pusher or replace spindle assembly. |
| | 4. Slight play in spindle (3). | Tighten spindle nut (59). If stripped, replace. |
| Record hits pickup arm (refer to exploded view). | 1. Record pusher (6) not moving far enough forward to eject record. | (See "Record Does Not Drop When Changer Cycles"-2). |
| | 2. Record pusher (6) extending beyond outside diameter of spindle. | Cycle changer, by hand, until pusher shaft and housing assembly (10) is at the top of its travel. Using new record as a gauge, pass it over the spindle to see if it binds at any point. File off high points on record pusher (6), with a fine file, until record will pass freely over spindle. |
| | 3. Pickup arm not adjusted properly. | (See "Adjustments"). |
| Needle does not set down on 10" record in proper position (refer to exploded view). | 1. Pickup arm not adjusted properly. | (See "Adjustments").<br><br>(a) Loose nut (11) on pickup arm shaft and sleeve (73). |
| | 2. Pickup arm shaft and sleeve (73) binding. | File off burrs and rough surfaces. Polish and lubricate shaft. |
| | 3. 7" set-down lever (61) and 12" record selector (17) not operating properly. | Insure that the proper operation and reset of the 7" set-down lever (61) and 12" record selector (17) is not being interfered with. |
| | 4. Needle bent. | Replace with new needle. |

| SYMPTON | CAUSE | REMEDY |
|---|---|---|
| | 5. Wire spring (43) broken. | 12" record selector (17) does not cock; check for broken 12" record selector spring (43). |
| | 6. Bent pickup arm return locator (71). | Straighten or replace. |
| | 7. Bent trip finger cam (73). | Straighten or replace. |
| Needle does not set down on 12" record in proper position (refer to exploded view). | 1. Diameter of 12" record undersize. | The set-down position of the needle for 12" records is determined by the edge of the record striking the 12" record selector (17). If a 12" record has a diameter of less than the standard size of 11-7/8" plus or minus 1/32", it may fail to depress the 12" record selector far enough. |
| | 2. Enlarged center hole in record. | An enlarged center hole might fail to set the 12" record selector because it could produce the same effect as a small record. |
| | 3. Pickup arm not adjusted properly. | (See "Adjustments") Page 8. |
| | 4. Binding of pickup arm shaft and sleeve (73). | Clean and polish shaft (73), and lubricate with light oil. |
| | 5. Reset lever spring (57) broken. | Replace spring (57). |
| | 6. 12" record selector spring (43) broken. | Replace spring (43). |
| | 7. 12" record selector (17) binding. | The 12" record selector must be free to operate smoothly. Clean out dirt and straighten if bent, or replace. |
| | 8. Bent pickup arm return locator (71). | Straighten or replace. |
| | 9. Bent trip finger cam (73). | Straighten or replace. |
| Needle does not set down on 7" record properly. | 1. 7" set-down lever spring (67) broken or weak. | Replace. |
| | 2. Pickup arm not adjusted properly. | (See "Adjustments") Page 8. |
| | 3. 7" set-down lever screw (63) loose. | Tighten. |
| | 4. 7" set-down lever (61) hitting frame or baseplate when it goes through hole in frame. | Straighten or replace. |
| | 5. Reset lever (64) bent. | Replace. |
| | 6. 7" set-down lever (61) does not fall into opening in main gear. | Replace. |
| | 7. Bent pickup arm return locator (71). | Straighten or replace. |
| | 8. Bent trip finger cam (73). | Straighten or Replace. |

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DENVER, COLORADO

TROUBLE CHART - Cont.

| SYMPTOM | CAUSE | REMEDY |
|---|---|---|
| Changer does not cycle when record has been played. | 1. No finishing trip groove on record. | Check record for eccentric trip groove in center of record. Some old records and home recordings do not have this eccentric trip groove. |
| | 2. Needle jumps out of grooves in record. | (a) Check trip pressure; the lateral pressure should not exceed 3 grams. (If pressure is excessive, see "Changer Trips Before Needle Reaches End of Record"). |
| | | (b) The record may be defective; the finishing groove is often too shallow. Check with a record that is known to be good. |
| | | (c) The needle point may be damaged or affected by an excessive accumulation of dust, lint, etc.; check needle pressure as described under "Adjustments". |
| | | (d) There may be binding in the pickup arm shaft and sleeve assembly (73) or between the pickup arm return locator (71) and the trip finger cam (73); (see "Needle Does Not Track Properly Across Record"). |
| | 3. Trip pawl binding on gear face. | The trip pawl must be free to move forward and engage the boss on the turntable hub when the trip lever releases it. Check for burrs or foreign matter lodged between the trip pawl and main gear (76). Do not oil as this might collect dirt and gum up the pawl. |
| | 4. Trip finger cam (73) bent. | Straighten or replace. |
| | 5. Trip link (82) bent. | Straighten or replace. |
| Changer trips before needle reaches end of record. | 1. Hole in record too large. | If the hole in the record is too large, the groove may turn eccentric with the spindle and cause premature tripping. |
| | 2. Binding of trip link (82). | With the trip link released, check the trip link for freedom of motion. It should be free to move without binding. |
| Needle does not track across record properly. | 1. Needle may be clogged by accumulation of lint, dirt, etc., or worn. | (a) Clean foreign material from around needle. |
| | | (b) Check needle to see if the tip is bent or broken. Replace, if necessary. |
| | 2. Trip finger cam (73) does not disengage from the pickup arm return locator (71) when cycle is completed. | There should be a 1/32" gap between the trip finger cam (73) and the pickup arm return locator (71) when the machine is not in cycle. If the gap is small enough to allow the parts to touch and bind as the needle moves across the record, the compression spring washer (72) may be weak or broken. Replace. |
| | 3. Check the bearing in the pickup arm post for binding. | (a) Check pickup arm return locator (71) and trip finger cam (73) for binding. (See 2 above). |
| | 4. Changer not level. | (See "Leveling Record Changer") Page 2. |
| | 5. Pickup leads too tight. | Give the pickup leads enough slack to allow the tone arm to move freely across a record. |

## ASTATIC CARTRIDGES

| | | |
|---|---|---|
| 2753 | Type LQD-1M complete | 7.50 |
| 3168 | Type LQD-1J complete | 9.50 |
| 3560 | Type GCAG-M complete | 7.50 |
| 3547 | Type GCAG-J complete | 8.50 |
| 4021 | Type LT4-AG complete | 7.90 |
| 4186 | Type AC-AG-M complete | 6.90 |
| 5172 | Type 12L3 complete | 8.75 |
| 4918 | Type ACD-M complete | 9.75 |
| 4254 | Type ACD-CM complete | 9.75 |
| 6115 | Type 15L3-DM complete | 9.00 |

## SHURE CARTRIDGES

| | | |
|---|---|---|
| 2606 | Type P-77 complete | 10.75 |
| 3182 | Type P-76A complete | 11.75 |
| 3368 | Type P-37-C complete | 7.50 |
| 3373 | Type P-81 complete | 7.75 |
| 3411 | Type P-81-A complete | 8.75 |
| 3455 | Type P-76-AF complete | 10.75 |
| 3691 | Type P-76-A complete | 10.75 |
| 3749 | Type P-37 complete | 7.43 |
| 4278 | Type PC-72-V complete | 9.75 |
| 4928 | Type PC-40 complete | 9.00 |

## ELECTRO-VOICE CARTRIDGES

| | | |
|---|---|---|
| 3384 | Type 33-4 complete | 7.25 |
| 4074 | Type 33S-2C complete | 7.70 |
| 4200 | Type 73 complete | 7.25 |

## WEBSTER-ELECTRIC CARTRIDGES

| | | |
|---|---|---|
| 2197 | Type F-14-2 complete | 8.50 |
| 3239 | Type A-1 complete | 8.50 |
| 3399 | Type A-1M complete | 7.50 |
| 3555 | Type A-1M-2 complete | 8.00 |
| 3917 | Type A-1-8 complete | 11.11 |

## SONOTONE CARTRIDGES

| | | |
|---|---|---|
| 3797 | Type W-7590-2 complete | 7.50 |
| 5508 | Type W-9980 complete | 10.50 |

## GENERAL ELECTRIC CARTRIDGES

| | | |
|---|---|---|
| 3512 | Type M-12D-G1 complete | 12.08 |
| | 3514 Needle Selector Knob | .18 |

NOTE:

Needles (Order from Distributor by manufacturers name and cartridge model number).

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## PARTS LIST

Prices subject to change without notice.

| Ref. No. | Part No. | Description | List Price |
|---|---|---|---|
| 1 | 5277E | Record Support Assembly | 1.25 |
| 1A | | 2903G Plastic Button | .08 |
| 2 | 5116A | Turntable and Hub Assembly | 2.15 |
| 3 | 3668 | Spindle and Bearing Assembly-Consists of 3667 Spindle Assembly less Ball Race and Washers | 7.09 |
| | | | 6.51 |
| 4 | | 2639 Bearing Washer | .05 |
| 5 | | 2624 Bearing (Ball Race) | .36 |
| 6 | | 1529 Record Pusher | .35 |
| 7 | | 2537 Spindle Body and Base Assembly | 5.25 |
| 8 | | 1527 Pusher Spring | .06 |
| 9 | | 2552 Pusher Shaft Spring | .03 |
| 10 | | 2539 Pusher Shaft and Housing Assembly | 2.59 |
| 11 | 3887 | Jam Nut | .03 |
| 12 | 4937 | Safety Spring | .08 |
| 13 | 3888 | Lockwasher | .01 |
| 14 | 4339 | Safety Plate | .02 |
| 15 | 4327 | Lift Pin | .19 |
| 16 | 4072 | Hinge Assembly | .68 |
| 17 | 2957 | 12" Record Selector | .19 |
| 18 | 2077 | Shipping Bolt | .04 |
| 19 | 101 | Screw 10-24 x 5/16"-Casting Hold-down and Lockwasher | .02 |
| 20 | 2907G | Reject Knob | .14 |
| 21 | 1651 | "C" Washer - Switch Control | .01 |
| 22 | 2558G | Tone-Arm Post (Used only on Model 950) | .09 |
| 23 | 4503G | Speed Control Knob | .28 |
| 24 | 2594 | "C" Washer - Switch Control | .01 |
| 25 | 2546 | Record Support Holddown Spring | .04 |
| 26 | 2110 | "C" Washer - Record Support Assembly | .01 |
| 27 | 4016 | Shut-off Spring | .12 |
| 28 | 4398 | Shut-off Bracket Assembly (For use on Model 950 Changers) | .36 |
| | 4320 | Shut-off Bracket Assembly (For use on Model 951 Changers) | .32 |
| 29 | 2053 | Screw 6 x 5/16 | .01 |
| 30 | 3836 | Motor Speed Control Rod (For use with General Industries Motor) | .20 |
| | 2942 | Motor Speed Control Rod (For use with Alliance Motor) | .20 |
| 31 | 4577 | Changer Support Leg (Used only on Model 950 Changers) | .06 |
| 32 | 2909 | Washer | .02 |
| 33 | 2597 | Control Shaft Assembly - Motor | .27 |
| 34 | 2765 | Rubber Grommet | .03 |
| 35 | 2599 | Switch Control Lever Assembly | .29 |
| 36 | 2910 | Compression Spring | .05 |
| 37 | 2600 | Shut-off Rod | .11 |
| 38 | 2952 | Fiber Washer | .01 |
| 39 | 1652 | "C" Washer for Item 58 | .01 |
| 40 | 4172 | Compression Spring for Item 17 | .01 |
| 41 | 1588 | "C" Washer for Item 17 | .01 |
| 42 | 1720 | Speed Nut-Spring-12" Record Selector | .01 |
| 43 | 2563 | Spring-12" Record Selector | .01 |
| 44 | 4330 | Die-Cast Frame | 3.43 |
| 45 | 1719 | "C" Washer-Main Gear Assembly | .01 |
| 47 | 2580 | Rubber Bumper | .02 |
| 48 | 2935 | Control Link | .03 |
| 49 | 101 | Screw 1-24 x 5/16 and Lockwasher | .02 |
| 50 | 467 | Switch | .41 |
| 51 | 4938 | Return Spring - Pickup Arm | .03 |
| 52 | 4950 | Fiber Washer | .01 |
| 53 | 2931 | Fiber Insulating Strip | .01 |
| 54 | 2573 | Switch Cover | .01 |
| 55 | 4212 | Retainer - Switch Cover Hold Down | .01 |
| 56 | 3901 | Reject Spring | .01 |
| 57 | 2925 | Spring - Reset Lever | .01 |
| 58 | 2284 | Control Shaft Assembly | .17 |
| 59 | 2208 | Pal Nut for Spindle | .02 |
| 60 | 2579 | Spring-7" Set-down Lever | .01 |
| 61 | 2581 | 7" Set-down Lever | .14 |
| 62 | 492 | Washer-Flat Steel-7" Set-down Lever | .01 |
| 63 | 4856 | Screw 6-32 x 1/4-7" Set-down Lever | .02 |
| 64 | 2560 | Reset Lever | .19 |
| 65 | 492 | Washer-Flat Steel-Reset Lever | .01 |
| 66 | 4856 | Screw 6-32 x 1/4-Reset Lever | .02 |
| 67 | 2579 | Spring for Shut-off Lever | .01 |
| 68 | 4947 | Lever Assembly Bearing | .29 |
| 69 | 2932 | Screw 4-40 Hex Head | .01 |
| 70 | 4013 | Lever Assembly - Shut-off | .34 |
| 71 | 2561 | Locator Plate - Tone Arm Return | .24 |
| | 6405 | Locator Plate-Tone Arm Return (Effective August 1, 1953, the 6405 Locator Plate was used on all 900 Series Models. Prior to that, part number 2561 applies) | |
| 71A | 2271 | Retaining Ring - Locator Plate | .01 |
| 72 | 2953 | Spring Washer | .01 |
| 73 | 4331 | Trip Finger Cam and Shaft Assembly | .77 |
| 74 | 3962 | Lift Pin Spring | |
| 75 | 1588 | "C" Washer-Lift Pin Spring | .01 |
| 76 | 5418 | Main Gear Assembly | .97 |
| 77 | | 1588 "C" Washer-Trip Lever Assembly | .01 |
| 78 | | 4172 Spring | .01 |
| 79 | | 5339 Pawl Lever | .13 |
| 80 | | 5338 Spring | |
| 81 | | 2569 Trip Lever Assembly | .14 |
| 82 | 2958 | Trip Link | .56 |
| 83 | 1588 | "C" Washer-Slide Retainer | .01 |
| 84 | 3915 | Slide Support | .07 |
| 85 | 2932 | Screw 4-40 Hex Head | .01 |
| 86 | 2295 | Spring-Slide Bearing | .05 |
| 87 | 4856 | Screw 6-32 x 1/2 | .02 |
| 88 | 2295 | Slide Bearing | .05 |
| 89 | 4014 | Slide and Cam Assembly | .46 |
| 91 | 2585 | Escape Lever Spring | .01 |
| 92 | 2274 | Flat Washer | .01 |

| Ref. No. | Part No. | Description | List Price | Ref. No. | Part No. | Description | List Price |
|---|---|---|---|---|---|---|---|
| 93 | 4856 | Screw 6-32 x 1/4 Slide and Cam Assembly | .02 | 123 | | 3140 Pulley 45 RPM | .71 |
| 94 | 2571 | Ejector Link Assembly | .26 | 124 | | 3141 Pulley 33 1/3 RPM | .69 |
| 95 | 101 | Screw 10-24 x 5/16 and Lockwasher | .02 | 125 | 5686 | General Industries Turret Motor 110V-60C | 12.45 |
| 96 | 4856 | Screw 6-32 x 1/4 | .02 | 126 | | 2772 Idler Wheel | .60 |
| 97 | 2951 | Terminal Strip | .06 | 127 | | 6189 Idler Arm Tension Spring | .08 |
| 98 | 2310 | Hinge Pivot Screw | .03 | 128 | | 6170 Idler Wheel Arm Assembly | .45 |
| 99 | 3602 | Hinge Button Bearing | .06 | 129 | | 3139 Pulley 78 RPM | .80 |
| 100 | 4215 | Plastic Tone Arm | 1.45 | 130 | | 3140 Pulley 45 RPM | .71 |
| 101 | 2508 | Hinge Spring | .19 | 131 | | 3141 Pulley 33 1/3 RPM | .69 |
| 102 | 2255 | Lock Spring | .05 | 132 | 4711 | General Industries 4 Pole Turret Motor | 12.85 |
| 103 | 2912 | Lift Screw | .03 | 133 | | 2772 Idler Wheel | .60 |
| 104 | 2934 | Adjusting Slide | .10 | 134 | | 6169 Idler Arm Tension Spring | .10 |
| 105 | 2509 | Strengthener and Bracket Assembly | .67 | 135 | | 5597 Idler Wheel Arm Assembly | 1.21 |
| 106 | 2275 | Strengthener Screw #4 x 1/4 Thread Cutting | .01 | 136 | | 5375 Pulley 78 RPM | .80 |
| 107 | 2449 | Screw for Slide 6-32 x 1/8 | .01 | 137 | | 5374 Pulley 45 RPM | .80 |
| 108 | 2860G | Cartridge Control Knob | .28 | 138 | | 5373 Pulley 33 1/3 RPM | .80 |
| 109 | 2606 | Cartridge "Shure P-76V" | 9.10 | 139 | 5691 | General Industries Turret Motor | 20.40 |
| 110 | 2904 | Cartridge Mounting Screw | .01 | 140 | | 2772 Idler Wheel | .60 |
| 111 | 5072 | Tone Arm | 1.41 | 141 | | 6169 Idler Arm Tension Spring | .10 |
| 112 | 3514 | Cartridge Knob | .18 | 142 | | 6170 Idler Wheel Arm Assembly | .45 |
| 113 | 3952 | Hinge Spring | .02 | 143 | | 5375 Pulley 78 RPM | .80 |
| 114 | 713 | Strengthener Screw | .02 | 144 | | 5374 Pulley 45 RPM | .80 |
| 115 | 4850 | Damper Bracket | .17 | 145 | | 5373 Pulley 33 1/3 RPM | .80 |
| 116 | 3512 | General Electric Cartridge | 12.08 | 146 | 4638 | Alliance Turret Motor | 12.10 |
| 117 | 1943 | Cartridge Mounting Screw | .01 | 147 | | 3481 Idler Wheel | 1.43 |
| 118 | 5355 | General Industries Turret Motor 110V-60C | 12.45 | 148 | | 3487 Idler Spring | .13 |
| 119 | | 2772 Idler Wheel | .60 | 149 | | 3485 Idler Arm and Pivot Assembly | .74 |
| 120 | | 3452 Pulley Arm Tension Spring | .13 | 150 | | 3484 Pulley 78 RPM | 1.08 |
| 121 | | 5597 Idler Wheel Arm Assembly | 1.21 | 151 | | 3483 Pulley 45 RPM | .97 |
| 122 | | 3139 Pulley 78 RPM | .80 | 152 | | 3482 Pulley 33 1/3 RPM | .99 |